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ABSTRACT

A study examined the effects of receiving formal reading instruction in kindergarten to 3,959 high school seniors from 24 school districts in 10 states. Over one-third of the subjects attended elementary schools that implemented a carefully developed beginning reading program in their kindergarten class back in 1973. Students from disadvantaged backgrounds were over-represented in the study. Data included measures of the amount of kindergarten reading instruction provided in each classroom in 1973-74; measures of students' family background and educational history variables as high school seniors; and measures of students' reading interests and competencies as high school seniors. A series of comparative analyses examined the relationship between kindergarten reading and subsequent school performance. Results indicated that kindergarten reading experiences were consistently associated with higher reading competency, higher grades in school, better attendance, fewer remedial experiences, and more positive attitudes toward reading. While the results were greatest for students from disadvantaged backgrounds, they held up across subpopulations defined by gender, social class, and ethnic background. Findings indicate strong support for providing formal reading instruction to kindergarten children. (Twenty tables and three figures of data are included; 81 references, a student booklet, a list of study participants, and computer printouts of data are attached.) (RS)

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TECHNICAL REPORT #1:
THE EFFECTS ON HIGH SCHOOL SENIORS OF BEING TAUGHT TO READ IN KINDERGARTEN

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EXECUTIVE SUMMARY

This study assessed the educational history and current reading proficiencies of a large number of high school seniors (N=3959) from twenty four school districts in ten states. The purpose was to examine the effects, if any, of receiving formal reading instruction in kindergarten. Over one third of these students attended elementary schools that implemented a carefully developed beginning reading program in their kindergarten class back in 1973. Although the study included kindergarten students from all backgrounds, those from disadvantaged backgrounds were over represented and were of special interest.

Information from three sources was combined to create the database for this study. They were: (1) measures of the amount of kindergarten reading instruction provided in each classroom during the 1973-74 school year; (2) measures of students' family background and educational history variables as high school seniors; and, (3) measures of students' current reading interests and competencies as high school seniors. A series of comparative analyses are presented which examined the relationship between kindergarten reading and subsequent school experiences and performance and current reading competencies. Clear and positive effects were shown to be associated with receiving kindergarten instruction on most of the effects variables evaluated. These variables included: (1) measures of reading competence (reading comprehension, reading vocabulary, and illiteracy) and, (2) schooling history variables (remedial educational experiences, school grades and attendance, and high school academic track).

Using both school level and student level data, the results show the kindergarten reading experience to be consistently associated with higher reading competency, higher grades in school, better attendance, fewer remedial experiences, and more positive attitudes toward reading. While these effects were greatest for students from disadvantaged backgrounds, they held up across subpopulations defined by gender, social class, and ethnic background. Even more astounding was the fact that, as a group, the students receiving the kindergarten reading instruction came from significantly lower social class backgrounds. Given that the results were obtained from a variety of analyses, the findings suggests that there is absolutely no evidence of any negative effects from learning to read in kindergarten. Collectively, these results provide strong support for providing formal reading instruction to children in kindergarten.

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ACKNOWLEDGEMENTS

This Technical Report represents the culmination of five years of research activity which began at The University of Tulsa in 1983. It shares considerable information on the study procedures and data sources with the Final Report to U.S. Department of Education for Grant No.8410091, which provided the initial support for this project. However, this report provides a more complete explanation of the project, includes major new sections devoted to further analyses of the data, and was written more carefully than the Final Report.

Our thanks once again to Dr. Terrell Bell, former Secretary of the U.S. Department of Education, for the original grant that supported the work; to Dr. Thomas Enderlein of the U.S. Office of Education for his assistance in administering grant funds and to The University of Tulsa administration and staff for the assistance provided. Finally, a most appreciative and sincere thanks to all the districts, staff, and students who took the time to provide the study information.

CHAPTER I

STUDY PERSPECTIVE, PURPOSE, AND BACKGROUND

The nature of the early childhood curriculum and the kinds of programs that should be provided for children before they enter first grade are currently the topic of much controversy and debate in public forums. While there never has been full agreement on these issues, the general assumption has been that children's formal education should begin in kindergarten, when they are about age five to six, with reading and other basic skills instruction beginning in first grade, when they are between six and seven years of age. This notion has been ingrainned in our society since the time of the Civil War, when the concept of kindergarten was first introduced as an entry level into the public school system and the beginning of children's formal education. However, despite this common belief, today the opportunity for most children to attend even half-day kindergarten at public expense is not universal and kindergarten attendance is mandated in only seven states (Association for School Supervision and Curriculum Development (ASCD), 1988).

While there has been a lag in general support to mandate kindergarten for all children and formally include preschool programs as part of the public education system, ninty-five percent of five year old children today attend kindergarten (ASCD, 1988) and a majority of them have typically been enrolled in day care and/or preschool programs prior to entering kindergarten. Although there are a number of reasons for this, most can be traced to the increasing number of women with young children working outside of the home. The most recent statistics show that over one-half of the women in the United States with children under one year of age now work outside the home (Department of Labor Statistics, 1988) As a result of this phenomena, as well as other social changes in the home and workplace, the precise role and function of kindergarten has been brought into question. Of primary concern is whether the kindergarten curriculum is appropriate in light of the major changes that have taken place in the preschool environment of children over the past several decades and whether or not children need to wait until first grade to begin reading instruction. With evidence of higher illiteracy and school dropout rates, educators are concerned with the effectiveness of specific types of curriculum and identifying the most appropriate and beneficial age for students to begin basic skills instruction.

During the early 1960's, a number of educational initiatives were launched as part of the Great Society legislation that had a direct impact on the educational experiences of preschool children. Two of these worthy of note were the TV series, *Sesame Street*, and Head Start, a federally sponsored preschool program for children from disadvantaged families. Both of these programs provide educational experiences in different forms to thousands of preschool children across the United States. Many of these experiences are similar to those language activities and basic skill concepts provided by the traditional kindergarten curriculum, such as learning to count and identify letters, numbers, shapes, and colors.

In addition to Head Start and *Sesame Street*, there have been other major changes in the preschool environment of children. As mentioned previously, daycare and/or preschool attendance have, or are rapidly becoming, the norm for most children. Although initially the primary emphasis of these child care services was custodial, increasingly parents are demanding that they include educational programs for children. As a result of these demands and increasing competition for enrollment, many of these preschool programs teach most or all of the traditional kindergarten curriculum. The kinds of educational readiness and enrichment activities available in the homes of many preschool children has also grown enormously. These include educational/cable TV programs, home computers, flashcards/books/workbooks, and educational games and toys ad nauseam.

Collectively, the influence of television and a "technological" environment, Head Start programs, emerging child care services that offer high quality educational programs, and concerns about illiterate adults, have resulted in much speculation concerning both the timing and the nature of the traditional kindergarten curriculum. The end result of contemporary influences has been to increasingly alter the skills and experiences of school children as compared to earlier times (Hanson and Kelble, 1985). Today, most children have had at least some exposure to many of the key elements of the traditional kindergarten curriculum and it is not uncommon for some children to enter kindergarten already reading. Further, most children have been involved in at least some kind of formal instructional setting, such as daycare, preschool, Sunday school and/or special lessons, before entering kindergarten. These changes have resulted in the preschool environment of children today being dramatically different from that of their parents and grandparents. This present-day preschool environment raises serious questions about what should be taught in kindergarten and turns the educational spotlight on the early childhood curriculum.

PURPOSE

One change in the curriculum that has been advocated by some educators for years is to begin reading instruction in kindergarten rather than waiting until first grade. However, many professionals have voiced strong criticism of this practice. The criticism has ranged from the notion that kindergarten reading instruction is "inefficient" simply because children are "not ready", to the contention that it will actually be harmful and have detrimental effects on their later reading competencies and interests. The latter contention can be traced directly to the work of Carlton Washburne, a prominent progressive educator who wrote extensively and persuasively on this topic in the 1930's (e.g., Washburne, 1936). Although much was written about the issue, little empirical evidence was provided.

The purpose of this study was to examine this issue empirically using an extensive and unique set of research data. The goal was to see if there was any evidence to support either the contention that early reading was of no consequence, or that of the advocates who thought early reading would have a powerful, positive effect over development.

Accordingly, this study presents data on the reading skills and attitudes of a national sample of high school seniors, many of whom were identified as having received direct reading instruction in kindergarten. While the study sample was broad (N=3,959), and children from all backgrounds were included in it, a special concern was the impact of kindergarten reading instruction on a specific population; those children from disadvantaged family backgrounds.

BACKGROUND

Although controversy over the kind of instruction that should be offered to preschool children can be traced to ancient times (e.g., Mason, 1984), this same debate and related issues concerning the kindergarten and early childhood curriculum, have recently gained national attention. The kindergarten curriculum, in particular, has been the focus of this controversy. The variety of opinions regarding the philosophy, content, and instructional methods of the kindergarten curriculum can readily be seen by simply reviewing volumes of the *Elementary School Journal* (e.g., see the topics cited by Hall, 1963). As these articles indicate, differing opinions have always abounded concerning what skills to teach in kindergarten as well as when and how to teach them.

One perspective on this controversy can be obtained by examining current school practices regarding the kindergarten curriculum and the teaching of reading. These practices show the steady emergence of pedagogical practices which delay the beginning of formal reading instruction for most children. This is in spite of the increase in early childhood programs and the other preschool influences referred to earlier. In citing support for such practices, several somewhat dated studies suggested that early reading instruction has detrimental long-term effects (Washburne, 1936; Dolch and Bloomster, 1937). A close examination of these studies, however, shows that, while they contain much rhetoric, they provide virtually no evidence for that proposition. A more popular form of these propositions embodies the child developmentalist position that children are simply "not ready" to read until the age of 6 1/2 (Elkind, 1986). This "readiness" philosophy implies that most children should be engaged in various kinds of language learning activities --

but *not* formal reading instruction until the age of six and one-half. It has also served as the foundation for maintaining the traditional kindergarten curricula in recent years.

One needs only to look at school district policies across the country regarding school entrance age, the grade level at which formal reading instruction begins, and several popular retention practices to see how this "readiness" notion becomes translated into schooling practices. For example, the age at which children are allowed to enter public schools in many communities has been *increasing* since at least 1860, while the length of the kindergarten day has *decreased* since World War II (Hall, 1963). Thus, most children entering kindergarten today are not only older, but they are also in attendance for a shorter period of time (usually one-half day) than children entering kindergarten in previous decades.

This readiness belief is also embodied in the kindergarten curriculum of most schools. Early reading has long been advocated and demonstrated to be associated with high achievement (e.g., Durkin, 1986). Also, the success of several formal kindergarten beginning reading programs implemented nationally in over 2000 thousand elementary schools during the early 1970's has been well documented (Hanson and Schutz, 1978). Yet in spite of ample evidence favoring kindergarten reading instruction, most schools typically do not implement formal reading instruction programs until the first grade. The current practice in most kindergarten classrooms is to keep reading readiness as the primary academic focus of the curriculum and to exclude any formal reading instruction (Bennett, 1986).

However, this practice of delaying reading instruction until first grade can result in an even longer postponement due to several notable retention practices, often referred to as providing "the gift of time." Because of a child's chronological age, activity level, and other developmental characteristics, parents are often encouraged to delay their child's entrance into kindergarten for an additional year. Hence, these children are six, not five, when they enter kindergarten. In addition, many schools employ questionable criteria to "place" children at the end of their kindergarten year. Children determined to be "not ready" for the traditional environment of a first grade classroom may be (1) retained in kindergarten for another year, or (2) placed in a "transitional" or "developmental" program between kindergarten and first grade (Shephard and Smith, 1984). All of these "gift of time" practices have the same effect: delaying formal reading instruction for another year. The end result of these practices is that many children who would normally enter kindergarten at age 5 1/2, and first grade at 6 1/2 years of age, are 7 1/2 years old or older when they enter first grade and begin receiving reading instruction.

There have been many studies to challenge these retention practices in general (e.g., Holmes and Matthews,

1984) and the kindergarten placement practices described. Many of these studies suggest that early reading is actually beneficial, not harmful, and that to wait for maturation, when there are concepts and skills to be developed, is akin to deliberately retarding the child (Clay, 1972).

Further, extensive research on both national and cross-national populations show reading instruction, both in the home and in school, to be both feasible and practiced with young children in many places (e.g., Hanson & Schutz, 1978; Stevenson, 1986). The latter study reported that Japanese and Chinese families routinely began teaching reading to their children at four years of age. In the former, over half a million kindergarten children in schools across the United States were taught to read in kindergarten using a systematically developed beginning reading program requiring only 20 to 30 minutes of instruction per day over a period of approximately 25 weeks. In a review of studies on preschool reading, Mason (1984), made these tentative conclusions:

> Many children begin to learn to read at a very early age through being read to, learning to identify and name letters and words, and learning to print, spell, and use printed labels in their drawings. This early knowledge is positively related to later reading and should be encouraged in kindergarten and preschool programs (p. 536).

In spite of these findings, however, the most recent pronouncements on the subject of kindergarten reading instruction continue to show ambivalence as to its importance and desirability. Former Secretary of Education, William Bennett (1986), best describes current school policy on this matter in his discussion of an educational curriculum designed to meet the "needs" of the preschool child. Referring to kindergarten, Bennett says:

> Some of these issues linger in kindergarten. Should it be mainly a place for creative play, or formal instruction, or both? According to a survey by Educational Research Service, 62.6 percent of kindergarten programs focus primarily on academic and social preparation for first grade. 49.6 percent of school districts list policies for teaching reading in kindergarten "for those ready and able" (p.59).

Further on, in the same section, Bennett notes that the same ambivalence reflected in school practices in the teaching of reading in kindergarten is also reflected in the current recommendations of this Study Group members (who assisted him in preparing the Report). He states:

> Within our Study Group there was ambivalence about the purpose of kindergarten (1986, p.59).

It is precisely this issue of the uncertainty regarding what school policy should be towards the formal teaching of reading skills at the kindergarten level that this study addresses.

Conducting such research is a difficult undertaking for several reasons. Biases against the practice of teaching children to read at an early age continue to prevail due to the notion that it has negative, long-term consequences (i.e., "early ripe, early rot"). Thus, to address the issue empirically, a significant amount of follow-up data would be needed on individuals who had been given systematic reading instruction in kindergarten, as well as data from meaningful comparison groups. The possibility of locating such sizeable groups of students seems quite remote given current school policies and operations.

However, due to a unique set of circumstances, and support provided by the U.S. Department of Education under Secretary of Education Terrell Bell, such a study became possible. Data on a large national sample of high school seniors who took part in a well-documented, systematic effort by their schools to teach reading in kindergarten during the 1973-74 academic year were gathered and analyzed. These data allow for the systematic examination of several major propositions regarding early reading. This technical report presents the first full presentation of the results from this study. It focuses directly on two primary study questions:

1. What long-term effects, if any, on reading and reading related variables did formal kindergarten reading instruction and learning have on students?
2. What specific effects, if any, were detectable for students typically labeled as "disadvantaged"?

CHAPTER II

STUDY METHODOLOGY AND DESIGN

Several areas of prior research are directly linked to the issues, methods, and procedures used in this study. One of these is the development effort and research questions addressed in a series of studies surrounding the Beginning Reading Program and carried out in the early 1970's (Hanson and Schutz, 1975). Collectively, this effort promulgated, on a national scale, the practice of teaching children to read in kindergarten. More importantly to the present research, these studies provided the vehicle for studying the impact of kindergarten reading. Accordingly, to understand how the present study became possible and meshes with recent issues in early childhood education, a brief chronology of the events surrounding the research and development of the Beginning Reading Program (developed by the Southwest Regional Laboratory (SWRL) during the years 1965 to 1971) is necessary.

DEVELOPMENT AND IMPLEMENTATION OF THE BEGINNING READING PROGRAM

Conceptual and empirical studies (Bloom, 1967; Brunner, 1960; Hunt, 1961) in the early 1960's suggested that an increased emphasis on language acquisition and literacy skills during childhood would be beneficial to the schooling achievement of underprivileged children. Through the Great

Society legislation of the late 60's and early 70's, federal money was available to examine this proposition on a national scale. To assist in carrying out national mandates to enhance student achievement, Regional Educational Laboratories were established with stated goals:

> for the conduct of research, for the articulation of the results of research into forms that cam be used in classrooms, for continuous testing of these forms, for the training of teachers in classrooms, for continuous testing of these forms, for the training of teachers in their use, and for making them available to local school systems (Hanson and Schutz, 1975, p.2).

One specific effort, which embodied all of the goals stated above, was the Beginning Reading Program (hence forth referred to as the BRP or the Program) developed by SWRL. The purpose of the Program was to teach children in kindergarten to read. This effort began in 1965 with a commitment to provide resources to schools which would reliably teach kindergarten students to read regardless of their previous cultural and educational experiences. This was the golden age of federal funding for educational R&D and SWRL utilized these resources to focus on this kindergarten reading program as its first important research and development venture. A staff of about 200 psychologists, linguists, educational researchers, and other technical personnel were involved in developing the Program.

The BRP was innovative in the sense that it sought to systematically introduce and teach reading skills to children in kindergarten through the use of a carefully designed and sequenced content with research based instructional procedures. The content of the BRP utilized both the phonetical and sight word approaches to reading instruction, with the major emphasis on the former. Every aspect of the Program was carefully researched, developed, and field tested before it was ever made available for use in schools.

The BRP was developed between 1969 and 1971 and field tested at a number of districts within the Southwest. These field tests involved the full implementation of the BRP in typical school settings with careful evaluation by SWRL staff members. The results showed that the Program was easy to use, effective in teaching initial reading, and well received by students, teachers, and parents (e.g., Resta and Hanson, 1971).

These findings, along with a new federal initiative to implement laboratory products, resulted in the national dissemination of the BRP between 1972 and 1974. The Program was implemented during these years with the support of federal funding under Title III. By then it was packaged by Ginn and Co., who published and distributed the instructional program as the central component of the SWRL/ Ginn Kindergarten Program.

In 1972-73 alone, over 400 school districts across the country agreed to use Title III funding to purchase and implement the Beginning Reading Program in their kindergartens. This agreement required that the districts participate in a national program evaluation effort that involved a number of innovative methodological components. Among these were the notions that evaluations should be (1) based on data from all participants rather than a sample; (2) used as a means of ensuring that the desired outcomes were attained (i.e., educational quality assurance), rather than for research purposes alone; and (3) had the goal of systematically gathering, analyzing, and reporting back to participating teachers, principals, and schools the results of their efforts. In this way, administrators could monitor the Program's effects in their own schools and credit the faculty who instigated them. This unique approach resulted in the creation of an extensively documented, national longitudinal database describing the BRP implementation efforts in a large number of kindergarten classrooms (e.g., Lehman & Hanson, 1981).

The complete history of the research and methodology that went into developing, refining, and researching the efforts of this Program was thoroughly documented in a series of technical reports, related articles, and professional papers (Hanson and Schutz, 1975; Hanson and Schutz, 1976; Hanson and Schutz, 1978; Hanson, Lehman, and Bailey, 1981; Hanson, 1986). The findings from this research indicated that:

> (1) high overall levels of outcome proficiency can be reliably attained in kindergarten reading instruction; (2) pupils from categories representing the full range of biosocial characteristics present in American schools can achieve high levels of proficiency on program

> outcomes under ordinary school conditions; (3) variations in program outcome proficiency are systematically related to characteristics of program use and instructional emphasis rather than to imputed personal deficiencies of pupils or their family situations (Hanson and Schutz, 1976, p.i).

In essence, the national implementation of this Program documented that children could be taught to read in kindergarten when the Program was used 20 to 30 minutes per day for about 25 weeks. Further, any observed differences in reading achievement among the participants measured at the end of kindergarten, could be clearly linked to operational factors, such as starting dates and time spent on instruction, rather than to less manipulable factors such as family or ethnic background.

The implications of this research for kindergarten were direct and clear: (1) schools across the country could teach kindergarten children to read in existing classes with a modest expenditure of time and resources without added personnel; and (2) five year old children, even from the most disadvantaged backgrounds, could be taught to read successfully the set of 51 short-story books that were the main component of the BRP.

After 1973-74, the Title III monies that funded the national implementation of this program were no longer available. In spite of this fact, many districts agreed to fund the Program on their own and SWRL continued to provide the unique program evaluation data gathered through 1979 (Hanson and Lehman, 1981). Collectively, this provided a copious and rare archival database for evaluating kindergarten reading. This database consisted of data on class, school, and district level efforts, including their degree of success, in implementing a formal reading program at the kindergarten level. In the two Title III years (1972-73 and 1973-74), data were obtained from over 2000 elementary schools in 400 school districts across the United States.

One set of these data, obtained from schools that took part in the BRP in the 1973-74 academic year, provided the basis for this study. Additional sets exist on several large cohorts of schools through the 1977-78 academic year. Thus the results obtained here can be subjected to direct replication, if desired, using these resources.

METHODOLOGICAL PERSPECTIVE

A critical aspect of this study was the methodology employed for identifying the effects of educational practices and programs. Such methods are always a challenging task (i.e., Cronbach, 1983). However, there have been substantial gains in our knowledge of how to conduct such policy studies in recent years. This progress dates back (at least) to the period of large scale federal involvement and support for educational research and development which began in the 1960's. Since that time, many studies and evaluations of educational and other social programs were carried out and evaluation research earned its place in the social sciences (e.g., Rossi & Freeman, 1982). While the findings often provided more controversy than pat answers, clear progress in the areas of policy research methodology can be detected.

One major methodological advance has been in the designs employed to study program effects. Traditional behavioral science research methodology makes clear distinctions between independent and dependent variables (Campbell & Stanley, 1966). The "ideal" for policy researchers has always been to have independent variables defined by random assignment of subjects to alternative, predefined, experimentally manipulated treatments; but reality has seldom fit the ideal. In most policy research, it is neither practical, nor ethical, to employ such randomized designs. Further, even if the logistical and ethical difficulties inherent to such approaches could be overcome, the relevant design factors (or independent variables) often cannot be fully specified in advance.

What has been slowly emerging in place of the classic experimental paradigm is a quasi-experimental methodology in which the major design factors of social programs become the variables that are embodied in what are referred to here as post hoc comparison groups (e.g., Hanson, 1986). In the case of program evaluations, these are usually groups of participants who differ substantially in terms of the implementation procedures and other factors that can be directly linked to program use, and also program effects. In the present inquiry, several major categories of post hoc comparison groups were identified for use in the study designs. One comparison was between the type of student population served by each of the schools: advantaged or disadvantaged. A second strategy was to categorize and compare the schools by the average amount of Program units completed in their kindergarten classes. For example, all teachers did not spend the same number of days using the BRP and more units of the Program were completed in some classrooms than in others (see Hanson and Schutz, 1978). Hence, the comparison between those students who received more units of reading instruction and those who received less provided a legitimate example of a post hoc design variable. In a third comparison, students were categorized by their type of kindergarten BRP experience. That is, whether they (1) entered school in kindergarten and attended a school that offered the BRP; (2) attended a school that implemented the kindergarten BRP but entered after kindergarten (i.e., first grade or later) or; (3) attended a school that did not implement the kindergarten BRP. Further details regarding these groups, as well as other groups used in the design formations to evaluate the effects variables, are discussed later. The point to be made here is that these factors (i.e., "disadvantaged/advantaged" and "amount of kindergarten BRP instruction") provide examples of the use of post hoc design variables leading to a meaningful comparison of effects.

Just as the notion of independent variables in program evaluation has been changing, so has the concept of dependent variables. One clear change in direction has been away from measures of individual differences based strictly on classical psychometric theory and towards criterion and domain referenced (function-specific) measures, more directly linked to the effects of interest (see Hanson and McMorris, 1987; Hanson and Siegel, 1988a). Such variables have a number of advantages over their predecessors. One of these is that the effects variables can be directly linked to costs (see Hanson, 1986). A variation on this theme employed in this study is to define effects variables at a level, and in units of analysis, that reflect meaningful cost differences. An example of such a policy variable is the classification of high school seniors into broad reading levels for which significant instructional requirements and costs can be directly associated. This issue will be discussed and illustrated in the description of the development of the study instruments and variables.

Another methodological perspective concerns the unit of analysis to be used in evaluating data. Extensive discussions have taken place in the literature on the desirability of using units of analysis above the individual student level in evaluation studies (e.g., Haney, 1974). Many of these discussions have demonstrated that the critical issue is actually the level in the educational structure at which significant differences in program implementation occur. Hence, the classroom, school, and district have been suggested as appropriate units of analyses in educational evaluation research. For example, instruction is typically presented to a class and not to individual students, per se. Therefore, to determine the impact of a particular program or intervention, the class, not the student, should be the unit of analysis. Effects can then be examined by comparing class means both within and between schools, as well as within and across districts.

In this study, several units of analysis were used. One was at the school level; the data describing the original kindergarten reading program in 1973-74 were available at this level. In other analyses, the student was used as the unit of analysis; in still others, the student was used but the effects of high schools were removed. The key issue in these analyses was to evaluate to what extent the results obtained could be replicated across large groups of students differing in terms of individual kindergarten experiences, not necessarily schools. However, because the data were obtained from students in different districts and high schools, and large differences can be found between such educational units, ways to control for these differences also needed to be considered. As the discussion of the study designs indicate, these differences were evaluated in the interpretation of the actual results. The point to be made here is that there has been a clearer understanding in recent years of the importance and relevance of units of analyses other than the student alone, depending upon the issues, decisions, and policies at hand.

KFS DESIGNS

The Kindergarten Follow-up Study began with a database on a large, national sample of elementary schools dating back over twelve years. These data contained the careful documentation of each schools' effort, and their degree of success, in teaching kindergarten children to read using the BRP during the 1973-74 school year (Hanson and Schutz, 1976). To this database, follow-up information was obtained from a sample of the original 1973-74 kindergarten students who attended the schools which implemented the BRP as well as other students who (1) attended those schools but not in kindergarten; or (2) attended elementary schools that did not implement the BRP. Collectively, these data allowed for the evaluation of the study data within three study designs. The first of these was formerly stated in advance in the study proposal (Design A). The other two (Designs B and C) emerged during the conduct of the study.

Design A

In formulating the follow-up study proposal, a two factor design was devised and it was assumed that only data on students who had received the kindergarten BRP would be included. The first factor, Title I eligibility, operationally placed BRP elementary schools into two categories. Those who were considered to be "disadvantaged" were categorized as "Title I Eligible" and the others were "Not Eligible". Federal guidelines employed in designating the original BRP elementary schools as eligible or not eligible for Title I funding were used for this purpose. This information had been gathered as part of the 1973-74 BRP study.

The second factor in this design, program implementation level, was defined as the amount of Beginning Reading Program instruction (in average number of BRP units completed) provided within each school. This was considered critical since extensive analyses of the original kindergarten reading study results had shown that (1) there were substantial differences in the extent of program implementation between schools (e.g., average number of units completed); (2) these differences in program implementation were the result of differences in the amount of time teachers used the BRP in their classrooms and not measured "readiness" characteristics of pupils and; (3) the extent of the implementation was directly related to the students' reading skills at the end of kindergarten (Hanson & Schutz, 1978). Thus, the total amount of instructional time that the teachers devoted to the reading program during the school year was shown to be directly related to the overall reading skill level of each class, as well as to the number of BRP units completed. Hence, the more time the teacher chose to spend on the BRP instruction, the more units the students completed; the more units the students completed, the better their reading ability.

To define the level of program implementation, data on the average number of BRP units completed within each school were utilized. Originally, it was hoped to have data from schools which fell into each of three "units completed" categories that were similar to those used in the original study (Hanson and Schutz, 1976). However, the data obtained allowed for the definition of only two distinct groups: those who completed some of the BRP (i.e., 1 to 7 units), and those who completed most or all of the BRP (i.e., 8 to 10 units). Using the two factors of program implementation level and Title I eligibility, a simple 2 x 2 design emerges (see Design A in Figure 1).

In this design, the unit of analysis was the elementary school. Thus, student level data was aggregated to estimate the school mean on each effects variable. This was consistent with the original study proposal (See Hanson and Siegel, 1988b) and the fact that the design factors were indeed at the school level.

Design B

In addition to the school level design, a second design emerged in the context of carrying out the study. This design uses student level data from three natural comparison groups: (1) those who **did not** attend one of the BRP schools; (2) those who attended a BRP school **after** kindergarten (i.e., first grade or later); and (3) those who attended a BRP elementary school for kindergarten and received reading instruction. Note that only group three includes students who received any kindergarten reading instruction. Thus, groups 1 and 2 would be expected to show comparable performance and be differentiated from group 3. In this design, the student was the unit of analysis (see Design B in Figure 1).

The data in Design B was evaluated in two ways. First, by simply comparing differences on potential effects variables among the three groups using a one way analysis of variance (ANOVA) design. The second way was to use a two way, main effects ANOVA design with the high school as one factor and the Design B categories as the second factor. In this way, variability in the effects variables due to differences among high schools (and districts) could be evaluated independently of the kindergarten experience variable.

Design C

A third design used to evaluate the effects of kindergarten reading combines features of Designs A and B (see Design C in Figure 1). In Design C, three groups of students are defined as follows: (1) those who did not receive kindergarten reading instruction; (2) those who received some kindergarten reading instruction (i.e., 1 to 7 units) and; (3) those who received most or all of the kindergarten reading instruction (i.e., 8 to 10 units). This design provides a more rigorous student level comparison since two of the groups received at least some kindergarten reading instruction. Here the expectation would be that group 1 would provide the baseline, group 2 would show more differentiation, and group 3 would show maximum differentiation on the effects variables. As with Design B, the results were evaluated using both a one way ANOVA and two way ANOVA, with the high school attended being the second main effects factor.

One final note regarding designs B and C. Because they use student-level data, other variables from the student questionnaire (i.e.,*The Reading Biographer)* could be used to further examine the results for the effects variables. The specific control factors examined were social class, gender, and ethnic background. Presentation of the results using these control factors allows for closer examination of any differences found among the three kindergarten experience groups in each design. They help determine if the findings for the overall population can be generalized across these subpopulations of interest.

DESIGN A (2 X 2)

	Title I Eligibility	
Kindergarten BRP	Yes (Disadvantaged)	No (Advantaged)
Some (1-7 Units)	School n = 17 Student n = >4	School n = 1 Student n = >4
Much (8-10 Units)	School n = 53 Student n = >4	School n = 14 Student n = >4

Note: Elementary School is the unit of analysis and only students who attended a BRP school are included.

DESIGN B (1 X 3)

Kindergarten Experience Categories

No kindergarten BRP/ No BRP elementary elementary school n = 1161	No kindergarten BRP/ Attended a BRP elementary school n=871	Kindergarten BRP/ Attended a BRP elementary school n = 1453

Note: Student is the unit of analysis and all students are included. High School is used as a control factor in the two way ANOVA.

DESIGN C (1 X 3)

Kindergarten Experience Categories

No Kindergarten BRP	Some Kindergarten BRP	Most Kindergarten BRP
n=2425	n=443	n=1091

Note: Student is the unit of analysis and all students are included. High School is used as a control factor in two way ANOVA

Figure 1. The Three Kindergarten BRP Follow-up Study Designs

METHODOLOGY FOR DERIVING THE EFFECTS VARIABLES

The primary instrument used for data collection was the *Student Booklet* and it is composed of three parts: (1) a norm-referenced test of reading comprehension, *The Academic Instruction Measurement System* (AIMS), (2) a vocabulary test, *The Reading Vocabulary Test*, and (3) a questionnaire, *The Reading Biographer* (see Appendix A for a copy of the *Student Booklet*). The vocabulary test and questionnaire were developed specifically for this study. Although a complete description of the development of the *Student Booklet* is presented later in this report, the general methodological strategy followed in deriving the actual effects variables from the item level responses contained in the *Student Booklet* deserves some comment.

The tests of reading comprehension and reading vocabulary are well-developed, selected response instruments typically used to measure student achievement in schools. While each is used alone for this purpose, they were selected because they conformed to the requirements for the formation of a major effects variable: the categorization of students' reading skill based on the Chall model of reading stages (Chall, 1983). Thus, these two measures, reading skill and vocabulary size, are combined to yield an the index of reading developmental stage. All of these variables are examined as important effects variables in the study designs.

In addition to these effects variables, a number of others were derived from *The Reading Biographer*. These pertain to aspects of the student's school performance during elementary and high school. They also include measures of the student's current attitude toward reading and how much reading they do outside of school. Together, variables measuring such components have been described as providing a fully representative model of reading (i.e., they address the cognitive, affective, and behavioral components of student reading) (Summers, 1977).

A complete list of the effects and other classification variables examined in this report are described in Table 1. Note that the dependent variables are presented in three clusters which correspond to: (1) Current Reading Competency, (2) Current Attitude and Status, and (2) Schooling History. In the analyses which follow, each of the variables within these three groups are evaluated within the three study designs.

Table 1. Description of the effects variables and demographics used in the study.

Category	Variable Name	Acronym	Description	Source Items[1]
Current Reading Competency	Reading Comprehension (Overall)	RDGSCR	summed AIMS reading raw score	26-45
	Reading Vocabulary	VOCSCR	summed vocabulary test raw score	1-25
	Reading Stage	STAGE	reading development stage in Chall's model	RDGSCR & VOCSCR
	Illiteracy	PSTAGE	Percent reading in lowest two stages	PSTAGE
Current Attitude & Behavior	Attitude	ATT	attitude toward reading in terms of reading enjoyment and perceived reading skill	14 1-t
	Books Read	NBOOKS	No. of books read in last year.	29
	Time Spent Reading	READING	Amount of free time spent each week reading	30 s-t
Schooling History	High School Curriculum	HSTRAK	high school curriculum track grades 9-12, core academic course work taken	25,26a-d
	Remediation	REMED	number of remedial classes taken grades K-12; times held back a grade	11 s-k
	Grades & Attendance	ACH	school achievement based on grades and attendance	18, 20
Family Background	Socioeconomic Status	SES	Family social class rating based on parents occupation	38,7
	Parents Education	TED	Combined educational level of parents	7

Note (1): Source items refers to the *Student Booklet* question number.

It should be noted that this brief discussion of the effects variables does not do justice to the time, effort, and care that went into their formation. In every case, these variables were formed following carefully defined measurement procedures. These included:

1. The development of individual items and questions with operationally defined responses designed to provide a maximum discrimination between the behavioral categories of interest;
2. Use of multiple items in the formulation of each variable to enhance internal consistency and reliability;
3. Multiple validity and reliability checks on the obtained results for each variable through item analyses;
4. The field testing of all items at least three times in a series of carefully evaluated pilot studies.

Finally, the designs in which the effects variables are evaluated, all involve the use of aggregated data. Given these well constructed variables, such data should provide sensitive and reliable indicators of the differences between the comparison groups of interest.

CHAPTER III

STUDY PROCEDURES

The execution of a study of this scope, given limited resources and the operational conditions present in most school districts, was an intricate and difficult task. In addition, other circumstances which emerged during the course of the study proved to make it even more challenging. There were many times when the research staff doubted it would be possible to complete the project in any useful form within the allotted time. In the pages that follow, a detailed chronology of the actual steps in carrying out the study is presented. However, before turning to these specifics, a description of the overall tasks and some of the problems encountered may help to place the more detailed procedures in perspective.

OVERVIEW

The study involved the completion of three major interrelated groups of tasks. One set of tasks was the design, development, pilot testing, and preparation of the study instruments. The *Student Booklet* was the major product of this effort. Another major set of tasks involved the identification of the follow-up schools and districts, the orchestration of the various liaison activities required to obtain and maintain their participation, and the actual data collection, coding, and entry process. These activities, as well as the resulting documents, are described in the "Logistical Procedures" section of this report. The various components and materials developed as part of these tasks can be found in the Technical Appendices to the Kindergarten Follow-up Study (Hanson and Siegel, 1988b). The final major block of tasks consisted of designing and conducting the study analyses, writing the technical report for the U.S. Department of Education (Hanson, Siegel, and Broach, 1986), and reporting the findings to the participating districts. This included: (1) constructing the databases, (2) defining the algorithms and creating the computer programs, (3) executing the programs and analyzing the data, (4) preparing the tables and reports from them, and (5) disseminating the reports to the appropriate parties.

A number of problems had to be resolved in order to carrying out these tasks. Some were inherent in large scale policy research, while others were idiosyncratic to this particular project. The former issues result from the fact that carrying out studies in schools is a logistically complex activity due to the lack of material and human resources for such endeavors. Most school districts have limited capabilities for gathering and maintaining information on their personnel, students, and programs; particularly for the kind of information required in this study. In spite of pronouncements about the dawn of the information age, modern management information technologies have clearly not yet impacted school record keeping to any substantial degree.

This was most evident in trying to locate specific students. The successful completion of this study required a strategy for locating students in senior high classrooms across the country who had entered specific elementary schools in 1973-74. Although the names of the elementary schools, as well as the target year, could be provided to the school districts, locating the students that still remained in the school system was a complicated task for most districts. Finding the time for high school seniors to take a test and complete a questionnaire was also a major obstacle for school personnel.

To resolve the task of data collection, two approaches were presented to the districts. The first approach involved tracking down the students who participated in the 1973-74 kindergarten BRP program through school records or a class survey, and then making arrangements for data collection from those identified. The second approach was to simply use the *Student Booklet* as a survey instrument and administer it to all the seniors in the high school, regardless of where they attended elementary school. Those who participated in the kindergarten BRP could then be identified through the schooling history section in *The Reading Biographer*. This second approach proved to be the strategy that most districts preferred. In addition, this approach served to provide additional useful comparison group information without excessive additional costs.

The internal logistical difficulties described above were not the only problems the study encountered. The funding for and timing of the project also proved problematical. The original contract was negotiated; the study was scheduled to begin in September, 1984, and be completed within one calendar year. However, project funding was delayed due to unrelated federal litigation freezing the funds for such projects. As a result, the starting date for the grant was delayed until January of 1985. Later, and also because of the results of the litigation, the actual funding for the study was substantially reduced. Hence, the exact amount of the project funding remained unclear until March 1986, fifteen months after the commencement of the study. At that time, the project deadline was extended to eighteen months and a portion of the original funds were provided to complete the project.

These two complicating factors impacted the project operations in several direct ways. Starting the project in mid-winter, as opposed to the start of the standard academic year, resulted in the attrition of several school districts for which replacements had to be recruited. Very simply, the participation of districts depended upon the professional interests and concerns of district administrators. When one crosses school years, the people and priorities often change.

The funding complication also impacted the final sampling plan. Many of the larger urban districts had to be excluded due to cost concerns associated with locating students and providing study materials. Finally, the original study provided for an honorarium to be given to the districts for their participation. The funding reduction eliminated this incentive. However, despite these difficulties, an excellent sample of school districts agreed to participate and followed through on their commitment. This is a credit to the school districts, staffs, schools, and students who took part in this study (See Appendix B for a list of these districts).

DISTRICT LIAISON AND LOGISTICS

The events and procedures involved in carrying out the logistical operations of the project are summarized in Table 2. What follows is a brief description.

The project formally began in January, 1985 when two major tasks were undertaken: (1) the design, development, and field testing of the *Student Booklet* and; (2) recruiting the study participants and orchestrating the logistics of the data collection. Each task was carried out by a graduate assistant under the direction of the principle investigator.

An initial procedure involved obtaining the complete 1973-74 BRP database from SWRL. This database was archived in part on magnetic tape and in part in the form of hard-copy printouts. The information in the 1973-74 BRP database included: (1) the original 1973-74 identification number; (2) Title I status; (3) Beginning Reading Program completion data within schools; (4) pre- and post-test reading scores by class, schools, and districts; (5) demographic data. The class records from the 1973-74 kindergarten BRP schools from districts that were participating in the 1985-86 follow-up study were extracted from these sources and entered into the study database. This procedure created a BRP database file which contained the Title I status, amount of program implementation, and demographic data of each kindergarten BRP school that was participating in the 1985-86 follow-up study.

A KFS directory listing of all of the school districts that had implemented the SWRL/ Ginn Kindergarten Program in 1973-74, and organized by state, district, and school, was compiled. Educational directories were then ordered from the state departments of education of the 14 states in which the 1973-74 kindergarten BRP school districts were located. From these educational directories, district superintendents were identified and in early May, 1985, invitational letters were mailed to them (Hanson and Siegel, 1988b). Nineteen affirmative responses and fourteen negative ones were received in reply to this first invitation. If the response was affirmative, the superintendent was asked to designate a staff member to act as the Project Coordinator for the district. Invitations and responses were tracked using a spread sheet and log-book. In August and September of 1985, follow-up calls were made to those superintendents who had not responded to the invitational letter. These follow-up calls resulted in additional districts agreeing to participate in the study.

In October, alternate forms of a second follow-up letter were mailed to the remaining 18 district superintendents who had not as yet responded (Hanson and Siegel, 1988b). One form of the letter was intended for districts with only one high school; the other form was intended for districts with multiple high schools. Both forms listed the elementary schools in the district that had participated in the 1973-74 Beginning Reading Program, summarized the data to be gathered, and suggested means as to how this could be accomplished with minimum effort and cost on their part. Follow-up calls were made later in the month to obtain responses from these districts.

Concurrent with the sample recruiting effort, a High School Information Sheet (HSIS) was sent out to each district that had agreed to participate (Hanson and Siegel, 1988b). The purpose of the HSIS was to obtain an estimate of the number of *Student Booklets* needed for each district. The HSIS listed the names of the Beginning Reading Program elementary schools in the district and the approximate number of 1973-74 BRP students. The Project Coordinator was asked to provide the name(s) of the high school(s) in the district and estimate the number of *Student Booklets* the district would need to carry out the survey.

By the end of October, 30 school districts had agreed to participate in the project. In early November, two sets of directions for administering the *Student Booklets* and returning them to The University of Tulsa were prepared. One set of directions was for the district Project Coordinator (Coordinator Information Sheet); the other set of directions was for the classroom teachers who would actually administer the *Student Booklets* (Teacher Information Sheet and Class Roster (Hanson and Siegel, 1988b)).

Eight thousand copies of the instrument were printed for distribution to the districts based on these HSIS estimates. Each *Student Booklet* was stamped with a district and booklet identification number. Piggy-back labels were purchased and a computer program was written to allow the following information to be printed on each label: (1) the student's name, if available (or a blank space for the students to write in their name), (2) the district's name, and (3) the Booklet identification number (see *Student Booklet* in Appendix A). These labels were affixed to the top right hand corner of the *Student Booklets.* When the students completed their Booklet, the faculty member administering the *Student Booklets* could peel off the label and affixed it to the Class Roster (Hanson and Siegel, 1988b).

The Booklets were then packaged for each district and mailed 4th class book rate to the respective district's Project Coordinator. Mailing and return labels were also created using a computer program. Each district package included: (1) the requested number of Booklets, (2) return label and postage, (3) an 8 x 10 pre-addressed postage-paid envelope for the Class Rosters, and (4) a set of instructions for administering the survey.

When the *Student Booklets* had been completed by the high school seniors and the labels from each class affixed to the Class Rosters, all Booklets and Class Rosters were collected by the Project Coordinator. The Project Coordinator then mailed the Class Rosters back to The University of Tulsa in a separate envelope while the Booklets were packaged and returned in the same boxes in which they were received.

Approximately half of the *Student Booklets* were mailed around Thanksgiving, 1985. Additional booklets were mailed in January, 1986; approximately 6000 *Student Booklets* were mailed by March, 1986. The delay in mailing some of the packages was due to the diverse time span in which the High School Response Sheets were received at The University of Tulsa. Many of the districts returned the Response Sheets after the winter break.

As a final effort to involve more school districts in the project, a follow-up packet was assembled. This packet consisted of: (1) a letter of introduction, (2) a copy of the original invitational letter, (3) a Response Sheet, and (4) a copy of the *Student Booklet*. This packet was mailed in early February, 1986 to selected superintendents who had not indicated whether or not their district would participate in the Kindergarten Follow-up Study. This third follow-up effort resulted in additional school districts agreeing to participate in the study.

The district mailings and associated correspondence and phone calls were tracked using a log-book and spreadsheet as before. Two to three days after each mailing, a notification phone call was made to each district's Project Coordinator alerting them to the mailing. Several coordinators indicated that the Booklet packages had already been received. Follow-up calls were also made to district Project Coordinators whose completed Booklets had not been returned to The University of Tulsa within approximately one month from the date that the packages had been mailed to them. All coordinators who received these follow-up calls acknowledged receiving the Booklets and that testing dates either had been, or would be, scheduled.

During April and May of 1986, due to insufficient time, three districts dropped out of the study after receiving their Booklets, leaving a total of 26 districts participating in the study. This count included one district that did not have any kindergarten BRP elementary schools. Initially, it was not clear exactly how this district obtained the invitational letter. However, it was later determined that this was a situation in which the high school was in a separate district from the elementary schools, and that the wrong high school had been mistakenly contacted. Although the data from this district could not be analyzed in terms of the effects of the Kindergarten Program, a complete analysis of the other variables could be reported.

Follow-up calls were made at the end of April, 1986 to seven district Project Coordinators from whom *Student Booklets* still had not been received. With the exception of one district, these coordinators had scheduled the Booklets to be completed by the end of the academic year. One coordinator reported that his students would be unable to complete the *Student Booklets* and that the district could no longer participate in the study. The number of participating districts at the end of May, 1986, was 26.

Several phone calls were made in June, 1986, to two districts that had not as yet returned their Booklets. These coordinators reported having mailed their Booklets; the U.S. Postal Service was notified and a trace was placed on these missing Booklets. However, the Booklets from these two districts were never located. This placed the final count of participating school districts at 24, with 23 districts having kindergarten BRP elementary schools. A total of 3,959 completed *Student Booklets* were returned to The University of Tulsa over the spring and early summer of 1986.

The logistical procedures involving Booklet coding, data entry, file manipulation, and data analysis are described in detail later in this chapter. The remaining tasks involved writing the required reports and disseminating them appropriately. The first document to be written was the Technical Report which chronicled KFS project procedures and outcomes. This was completed and mailed to the U.S. Department of Education in September of 1986 to fulfill grant requirements.

The final task was to create the District Report Packet. This packet was promised to the districts in return for their participation and included a summary of the study findings, as well as data on the effects variables for each individual district. Creating the District Report Packet involved: (1) writing and executing an SPSSx program to compute the ANOVA's for the effects variables for each district; (2) writing the Summary Report from the information compiled in the technical report for the U.S Department of Education (Hanson, et.al 1986), and (3) developing a cover letter and entering the necessary data in the computer to personalize it. The funding for this phase of the project was provided by a grant from the The University of Tulsa Graduate School.

In April of 1988, each participating district was mailed a District Report Packet containing: (1) a cover letter, (2) a summary of the final report, (3) a copy of the *Student Booklet*, and (3) a one page description of the data from their district. An order form was also included to allow the districts to obtain copies of the technical report, as well as related professional papers and published articles. Space was also provided for the districts to request additional information and comment.

Table 2. Kindergarten BRP Follow-up Study procedures and products.

No.	Procedures	Date	Products
1.	Project was approved, Principle Investigator and two full time. graduate students began work.	Jan. 85	Major tasks in carrying out the project were assigned.
2.	Contacted the state department of education in the 14 states of all districts that had used the SWRL/Ginn Beginning Reading Program (BRP) during the school year 1973-74 to order their educational directories.	Jan. 85	Received educational directories from 14 states.
3.	Compiled a list of the names, addresses, and phone no. of the superintendents in the districts that had used the BRP.	Feb. 85	Directory containing 82 names, addresses, and phone nos.
4.	Mailed letters with response sheets and returned envelopes to the 82 superintendents of school districts that had used the BRP during the 1973-74 school year and invited their participation.		May 85 Received 33 initial responses during the summer and fall of 1895: 19 "Yes" & 14 "No".
5.	Created a spread sheet listing the names and IDs of the school districts that had been invited to participate, the name of the superintendent, their response, the date of their response, and the name of the person designated as the Project Coordinator (if their response was affirmative).	May 85	Master Response List
6.	Created a log-book containing: the response sheet from those districts that agreed to participate, the name, address, and phone number of the Project Coordinator (listed on the Response Sheet), and the names and IDs of the elementary schools in the districts that took part in the Program. All communications with these districts were kept or noted in this log-book.	June 85	Participating District Notebook
7.	Made follow-up calls to districts that had not responded and invited their participation.	Aug., Sept. 85	Received more response (positive & negative), requests for additional information, and requests for the original letter which some districts had misplaced or never received.

(table continues)

Table 2. Kindergarten BRP Follow-up Study procedures and products.

No.	Procedures	Date	Products
8.	Mailed out 18 follow-up letters to those districts that had not responded and several large districts that, to date, had not been invited to participate. Enclosed with each letter was a copy of the *Student Booklet*.	Oct. 85	One large district and 9 other districts agreed to participate.
9.	Up-dated the Participating District Notebook as needed to: (1) delete those districts that, due to staff change, or other unforeseeable circumstances, had to drop out of the study; (2) add districts, and (3) record communications with the participating districts.	Oct.-May 85	Record of events and status of participating districts was kept current.
10.	Mailed out a Response Sheet to the Project Coordinators to get an estimate of the number of *Student Booklets* needed to survey their districts' senior class.	Oct. 85	An estimated 6000 Student Booklets were needed for 30 districts
11.	Directions and procedures for administering the Booklets and returning them to The University of Tulsa were developed (Note: the Class Roster was attached to the Teacher Information Sheet).	Nov. 85	Two sets of directions were developed: one set for the Project Coordinator (The Coordinator Information Sheet), and one set for the teachers who would be administering the *Student Booklet* (The Teacher Information Sheet).
12.	8000 *Student Booklets* were ordered and district delivered (in boxes of 200 each) to the research room in Chapman Hall at The University of Tulsa.	Nov. 85	Booklets for each were stamped with a district and a Booklet ID number.

(table continues)

Table 2. Kindergarten BRP Follow-up Study procedures and products.

No.	Procedures	Date	Products
13.	Piggyback labels were purchased and a computer program was written to allow the following information to be printed on each label: (1) student's name (or a space for the student's name), (2) district's name, and(3) Booklet number.	Nov. 85	The labels were attached to the stamped *Student Booklets*.
14.	Another log-book was established that would contain information and correspondence with those school districts to which the Student Booklets were sent. The Class Rosters that were mailed from these districts were also kept in this log-book.	Dec. 85	A Participant Directory for 30 districts was compiled.
15.	Booklets for each district were packaged in boxes and mailed 4th class book rate to the Project Coordinators. Included with each shipment was: (1) a return label and postage, (2) a return envelope and postage for the Class Rosters to be returned first class to The University of Tulsa.	Nov.-Mar. 85-86	Most Booklets were mailed out in Nov., 1985 and Jan., 1986. All booklets had been mailed by March, 1986.
16.	A spreadsheet was created that listed: the participating districts and their ID, the name and phone no. of the Coordinators, the date that the Booklets were shipped, and the date that the completed Booklets were received back at The University of Tulsa.	Dec. 85	Booklet Return Sheet
17.	Two-three days after the Booklets were mailed, a follow-up phone call was made to notify the Project Coordinators that the Booklets had been mailed and to be expecting their arrival.	Nov.-Mar. 85-86	All Project Coordinators were contacted concerning the Booklet shipment and the enclosures.

(table continues)

Table 2. Kindergarten BRP Follow-up Study procedures and products.

No.	Procedures	Date	Products
18.	Due to insufficient time, three districts dropped out of the study after their Booklets were mailed.	Mar.-May 86	Their files were removed from the Directory and placed back in the Project Notebook. Booklets from two districts were returned to The University of Tulsa. To date, the total participating districts was 27.
19.	Follow-up calls were made to those Project Coordinators whose completed Booklets had not been received at The University of Tulsa within approximately one month from the time they had been initially mailed out from The University of Tulsa.	Jan.-Apr. 86	All districts confirmed that they had received their Booklets and had either scheduled, or would schedule, a testing date.
20.	Follow-up calls were made at the end of April to seven districts whose Booklets had still not been received at The University of Tulsa.	Apr. 86	With the exception of one district, all Booklets were scheduled to be completed by the end of the academic year. The one district reported that they would be unable to complete the Booklets and could no longer participate in the study. The number of participating districts was now 26; 25 districts with BRP schools, and one district without BRP schools.
21.	Follow-up phone calls were made in June to two districts whose completed Booklets had not yet been received at The University Of Tulsa.	June 86	These districts indicated that the Booklets had been shipped to Tulsa the last week in May.

(table continues)

Table 2. Kindergarten BRP Follow-up Study procedures and products.

No.	Procedures	Date	Products
22.	Phone calls were made to the district area post offices to request that a trace be placed on these materials.	June 86	The post offices reported that the appropriate forms would be mailed to the schools from which the packages were mailed and this would initiate the locating procedure.
23.	The Booklets from these districts were never located.	June 86	A total of 3,959 Booklets were received.
24.	After receipt of the *Student Booklets*, all items were coded following the rules in the Code book.	Apr.-May 86	Coded Booklets
25.	Entered data from the *Student Booklet* twice by district; ran checking program to make corrections, and restored data.	May 86	Clean data files (Part I and Part II).
26.	Created school level file by aggregating class level variable files in SPSSx; created a working file from selected variables in the two KFS files and the BRP file.	May 86	Three separate working data files.
27.	Merged the three working files together and ran the analyses.	June 86	Complete working database.
28.	Wrote the final report to the U.S. Department of Education	Sept. 86	Report was submitted to the U.S Dept. of Education
29.	Wrote professional papers, Created and ran SPSSx programs, wrote the summary report for districts, and compiled a District Report packet. Funding for this phase of the project was provided by The University of Tulsa Graduate School.	Jan. 87-Mar. 88	District Report Packets were compiled and mailed to the 24 participating school districts. Professional papers were presented at AERA in 1987 and 1988 and at NCME in 1988.

BOOKLET CODING AND DATA ENTRY

Booklet coding began in March, 1986 with the hiring and training of one graduate and one undergraduate student. The Booklets from three of the smallest districts were completely coded and a meeting was held to discuss coding problems. The student coders were given blank Booklets and each item in the Booklet was discussed in regard to the coding format. Using the Coding Directory as a guide, decisions were made as to the exact coding format for each item in the *Student Booklet* and a Master Coding Guide was developed for coding the returned Booklets (Hanson and Siegel, 1988b). The Booklets from the three districts that had already been coded were reviewed for errors and a routine for coding the *Student Booklets* was established.

Coding Routine

The first section to be coded in all *Student Booklets* was Item number 1 in Part II of the questionnaire section (i.e., *The Reading Biographer)*. This open-ended item consisted of seven parts and identified the students' schools, their locations, and what grades they attended at each school. This item was the most difficult and time consuming to code, so it was completed first. After coding this schooling history item within a district, another individual coded the reading and vocabulary tests (Part I of the *Student Booklet*). This was the easiest section to code, and could be done fairly quickly. As soon as Part I and the first item from Part II were coded for each *Student Booklet* within a district, this data was double entered into the mainframe computer, checked for accuracy, and frequency distributions were obtained to identify any irregularities in the data entries. The remainder of the items from Part II of the Booklets were then coded, double entered, checked, and frequency distributions obtained. Any irregularities indicated by the frequency distributions were then physically examined and resolved.

By mid-May, 1986, when data entry began in earnest, the coding and data entry staff consisted of six students from The University of Tulsa. All of the data entry workers had been involved in the coding process. This proved to be a definite advantage; these individuals could identify and correct any errors as the data were entered. The Booklets were always grouped and handled by district and a checklist indicating the coding and data entry status of the Booklets was attached to the stack of Booklets from each district. A master checklist was also posted and the tasks checked off as they were completed. In addition, the names of the coding and data entry students were written on this master list in the column that listed the task on which they were working.

Data Entry

All data were entered twice into the computer; Fortran checking programs were written to identify data entry errors. The checking programs were run on the data from both parts of the *Student Booklet* for each district and appropriate corrections were made. Next, the first set of cleaned data from each of the 24 school districts, which contained the test items from Part I and item 1 from Part II in the *Student Booklet*, were merged into a single file to create an all-district data file called Part I. Likewise, the second set of cleaned data from each school district, which contained the remainder of the items from Part II in the *Student Booklet*, were merged into a second file to create an all-district data file called Part II. This process created two Kindergarten Follow-up Study (KFS) data files: Part I KFS data file and Part II KFS data file.

FILE MANIPULATION AND DATA ANALYSIS

The next step involved utilizing data from a third data file referred to as the BRP data file and described earlier in this section. This file contained school, class, and student level data from the original 1973-74 kindergarten BRP school studies for students who were participating in the present study. Frequency distributions were run on the BRP data file. The purpose of this procedure was to match the IDs of the schools from the original study with those in the follow-up study. A table was created to indicate: (1) the name of each district that participated in both studies; (2) the district and school codes for the BRP elementary schools represented in both studies; (3) the names of the BRP elementary schools represented in both studies; (4) the number of students (seniors) that had attended each of the BRP elementary schools represented in both studies; and (5) the total number of follow-up districts, school, and students from these kindergarten BRP elementary schools.

A final step involved creating working files from each of these three participating district data files (i.e., Part I, Part II, and BRP) and compiling a single data base on which to run the analyses. This involved several procedures. First, key variables were identified from each of the three data files: Part I, Part II, and BRP. Next, using SPSSx program commands, the key variables from each of these three data files were extracted and written to separate working (out) files. This resulted in three "key variable" working files (i.e., Part I out file, Part II out file, and BRP out file). Finally, these three working files were merged into a single file to create the database that was used in the KFS data analyses.

All data analysis were carried out using the SPSSx computer program on the Honeywell computer at The University of Tulsa. Separate documentation of their exact coding is available upon request from Hanson Research Systems .

INSTRUMENT DEVELOPMENT

Concurrent with the liaison activities with the school districts, prototype instrument development on the *Student Booklet* were being carried out. The general goal was to assess both the factors influencing reading and the current reading status of high school seniors. The first step in this process was to develop a rationale and set of specifications for the instrument. This involved two activities: (1) a review of the schooling effects research, and (2) logical and analytical evaluation of measures of reading status and the factors influencing these measures. Major schooling effects policy studies such as Coleman, et al. (1966), Mayeske, Okada, Beaton, Cohen, & Wisler (1973), the Sustaining Effects Study (Hemingway, Wang, Kenoyer, Hoepfner, Bear, & Smith, 1978), the International Education Evaluation Association (Postlethwaite, 1974; Thorndike, 1967) and reviews of ongoing programs such as High School and Beyond (NCES, 1982; Peng, Fetters, & Kolstad, 1981) and the National Assessment of Educational Progress (1981) were reviewed. From them, the major classes of variables used to assess and represent student history and reading status were identified.

Three classes of variables emerged and are described in Table 3. These are: (1) those characterizing the student's abilities; (2) those characterizing the student's home experiences (including the parents); and (3) those characterizing the student's school experiences. These three general classes of variables formed the initial conceptual framework for the development of the *Student Booklet*.

Table 3. Types of variables used in some previous schooling effects policy studies.

Study	Student	Family	School	Criterion
Coleman/ Mayeske	Ethnicity Educational Plans Study habits Work-success attitude	Ethnicity SES Parental Expectations for achievement/ expectation	Curricular track Instructional practices Financial indices	CTBS Reading achievement
Sustaining Effects Study	Study habits Reading Attitude	Family size; SES; Parental education; Residence; Parental involvement in schooling; Reading resources in home; Parental Expectations	Instructional practices; Leadership; Attendance	CTBS Reading achievement
HS&B	Activities participation Career plans Study habits Self-attitude	Parental education/ occupation Parental Involvement in schooling; Parental Expectations	Curricular track Coursework Grades	ACT/SAT Scores
NAEP	Study habits Activities participation Reading behavior; Ethnicity	Reading resources in home; Home language; Parental education Ethnicity		NAEP Reading tests
IEA	Sex, age Attitudes to school & subject; Reading behavior; Educational & occupational expectations	Parental Education; Parental involvement in schooling	Program Type of School	IEA Reading comprehension, Vocabulary, Reading speed

1. Student Variables.

Relevant variables characterizing the student can be broken into four categories: (1) student demographics such as age, sex, race, and birth order; (2) student behaviors, such as study habits, time spent reading, and participation in activities; (3) student attitudes and expectations, such as attitude towards school and reading, and career and educational plans; and (4) student reading competence. Reading competence is commonly assessed either by standardized tests of vocabulary and reading comprehension or by instruments developed for a specific study as in the National Assessment of Educational Progress. The form and content of the latter are, however, similar to the standardized measures.

2. Home Variables.

Relevant variables characterizing the student's home and parents fall into five broad categories: (1) socio-economic status variables, such as parental education, occupation, and income; (2) family demographics, such as home language, residence, race, and family size; (3) parent-child interactions, such as parental involvement in the schooling process, parental reading to children, and supervision of homework; (4) parental expectations of the child in terms of education and success or achievement in school; and (5) reading resources and behaviors in the home such as the number of magazines and books in the home and how often and how much the parents read.

3. School Variables.

Variables characterizing the student's experience in school include (1) instructional practices in the classroom and within the school as a unit, (2) leadership within the school, (3) the curricula track of the student, (4) coursework taken by the student, (5) grades, and (6) attendance.

Based on the analysis of previous studies and related longitudinal work, a framework for instrument development was prepared. This conceptual framework was used to guide the initial development of the actual instrument. By anchoring the instrument specifications to previous research, the variables assessed would be expected to be consistent with earlier policy research in this area.

In actual development, the work was divided into two parts: (1) those items representing the student's reading-related history, which would form the questionnaire section of the *Student Booklet* and be referred to as *The Reading Biographer;* and (2) those items representing the student's current reading status, which included a reading comprehension test and a vocabulary test. These design specifications are presented in Table 4 and Figure 2.

Table 4. Design specifications for the *Student Booklet*

			Domain	
Area	**Time Frame**	Parent/Home	Student	School
History	Preschool	Race; Language; Preschool environment	Language; Birth order	Formal preschool education/ Head Start
	Kindergarten			Quality Assurance Database
	Elem. School	Geographic stability; Family rules in home; Parental involvement in schooling activities	Reading age; Achievement; School stability	Homework load; Remediation
	Secondary School	Geographic stability; Family rules in the home; Parental involvement in schooling; Parental reading behavior; SES; Parental expectations	School stability Personal resources Achievement Activities Student expectations	Curricular track; Homework Remediation
Reading Status	Secondary School		Reading stage skill development vocabulary size; Reading attitude enjoyment perceived skill; Reading behavior	

In summary, four broad, general constraints were imposed on the study instrument. First, the instrument items would be aggregated upwards to form meaningful composite variables to represent student history and reading status. Second, the instrument had to represent the home and school domains of variables over time in order to adequately describe student history over the twelve years intervening between the original intervention and subsequent assessment. Third, the instrument would have to utilize a multiple-choice format as much as possible due to the probable size of the sample and inherent difficulties in managing over 4000 booklets. Fourth, the instrument could take no more than two class periods (less than 2 hours) to complete.

THE READING BIOGRAPHER

The items representing student reading-related history and contained in *The Reading Biographer* address those clearly identifiable and measurable experiences from early childhood through young adulthood that either had been identified in earlier research, or were logically anticipated to be related to adult reading levels. Figure 2 represents the conceptual framework for *The Reading Biographer*.

Schooling Levels		Reading-related experiences at each schooling level in the indicated area.		
Age	Level	Formal Schooling	Home/ Family	Extra-curricular
0-4	Preschool	X	X	
5-13	Elementary	X	X	
14-18	Secondary	X	X	X

Figure 2. Seven Cell Conceptual design for *The Reading Biographer.*

As Figure 2 indicates, the guideline adopted for *The Reading Biographer* was that the formal schooling, home and extracurricular domain variables should be measured at three points in time: (1) the preschool years, or the years prior to starting formal school; (2) the elementary school years in which reading instruction is paramount; and (3) the secondary school years in which reading skills are extended and consolidated. The preschool environment was defined as the degree to which the student's preschool experiences nurtured or prepared the child for reading. Indicators of nurturance of reading and language skills include the frequency and type of educational experiences/activities in the home, the amount of time the child spent in the company of parents or other adults, particularly the mother, and participation in formal preschool educational programs such as Head Start.

During the elementary school years, reading skills are developed through experiences in both the home and the school. Some factors from the home setting include the degree to which the family provides a positive, reasonably structured home environment (Chall & Snow, 1984); the degree to which the parents are involved in the schooling process and; the amount of reading-related homework completed. The school impacts the reading skills of the students through the type of curriculum and/or track that the student follows (compensatory, mainstream, or accelerated) and specific academic tasks required by teachers for students to complete.

During the secondary school years, these same classes of home and schooling variables would be expected to continue influencing the development of student reading skills. At this level, however the influence of parental role models as well as the activities of the student (i.e., where and how the teenager spends time and energy) have been found to have an effect on the development of reading skills (Levine, 1983; Marston, 1982). Linked to this would be the resources that the student accumulates, such as books, magazines, reference materials as well as educational products in the home.

From these broad specifications, detailed specifications for the major study variables were developed (see Table 5). These specifications provide a definition of the variable, its probable scaling, and the indicators that eventually might be used to measure the variable. The policy variables were designed to sort the respondents into meaningful categories based on their responses to multiple indicators. The value associated with a policy variable represented the broad category or group to which the student belonged. For example, indicators for the preschool environment included six types of parent-child activities and six types of formal preschool educational experiences. Respondents indicated how often, on an ordinal scale, they recalled participating in these 12 different types of activities. These item responses were then aggregated upwards to form a composite index representing parent-child reading nurturance. The conceptual, analytical definition of the preschool environment also included information about the degree of maternal availability. Indicators for maternal availability included the frequency that the mother worked outside of the home and the pattern of child-care arrangements as the student recalls. Again, these items were aggregated upwards to form a composite index representing maternal availability. These two indices, reading nurturance and maternal availability, were then combined, through analysis of the response patterns, to create an ordinally scaled variable representing the degree to which pre-reading skills were nurtured before the student began formal kindergarten. This logic was used throughout the study to build variables; the algorithms for each variable are available in the Technical Appendices (Hanson and Siegel, 1988b).

Table 5. Indicators and Scaling Specifications for the *Student Booklet*

Variable	**Definition**	**Scaling**	**Possible indicator**	**Scaling**
Student demographics	standard demographic characteristics	nominal	sex, race age	nominal interval
Student Activities	the pattern of activities student engaged in and out of school	nominal	time spent in school activities school groups/ teams homework private lessons;	interval
			time spent in non-school activities recreational groups/ teams socializing/ dating, TV, hobbies, chores, jobs	interval
Student Resources	the assets the student owns in secondary school	ordinal	car, phone, stereo, etc.	nominal
Student Achievement	achievement in Elementary and secondary school	ordinal	grades in subjects attendance	ordinal interval
Student Expectations	aspirations, expectations of success and status in secondary sch.	ordinal	educational plans	interval
			occupational plans	nominal
Student Reading	the amount of time & frequency of reading in secondary school	ordinal	time spent reading;	interval
			number of books, etc read;	interval
			age at which S began to read	interval
Student Reading Attitude	affective attitude towards reading in secondary school	ordinal	prefers books to other activities;	ordinal
			perceives self as a reader;	ordinal
			values reading for success;	ordinal
			enjoys reading	ordinal

(table continues)

Table 5. Indicators and Scaling Specifications for *Student Booklet*

Variable	**Definition**	**Scaling**	**Possible indicator**	**Scaling**
School Stability	the continuity in student school experience in elem. & secondary school	ordinal	time in each school;	interval
			number of schools attended;	interval
			number of cities lived in	interval
Remediation	the amount of compensatory education experience K-12	ordinal	remedial English, reading, etc;	interval
			bilingual classes;	interval
			number of times held back	interval
Program	the curricular program of the student in elem & secondary sch.	nominal	vo-tech, general, college prep tracks	nominal
			academic courses taken each year	nominal
Family Demographics	demographic characteristics	nominal	race, language	nominal
			family size	interval
Family SES	socio-economic status	ordinal	parental education;	interval
			parental occupation;	ordinal
			parental income	ratio
Preschool Home Environment	degree of reading/ language nurturance ages 1-5	ordinal	parent-child interactions such as playing games, talking, etc;	ordinal
			formal preschool education frequency & type;	nominal
			maternal availability working mom, childcare	interval
Home Environment	degree of structure or rules when the student was in elementary & secondary school	ordinal	regular mealtimes;	ordinal
			regular bedtime;	ordinal
			TV controlled;	ordinal
			homework supervised, enforced;	ordinal
			assigned chores;	ordinal
			amount of rewards/ punishment;	ordinal
			dating rules, curfews, etc.	ordinal

(table continues)

Table 5. Indicators and Scaling Specifications for *Student Booklet*

Variable	**Definition**	**Scaling**	**Possible indicator**	**Scaling**
Parental School Involvement	degree of involvement in elem. & secondary activities	ordinal	attending PTA conferences;	ordinal
		ordinal	attending school events;	ordinal
			enrichment activities such as taking the child to library, giving books, traveling, cultural events, talking about school and books	ordinal
Parent Reading	frequency and time parents read	ordinal	time spent reading books, magazines, etc in home	interval
Parental Expectations	the press for achievement as seen by the child	ordinal	occupational goals for child;	nominal
			educational goals;	interval
			expected school grades	ordinal

READING COMPREHENSION AND VOCABULARY

In the area of current student reading status, measures were sought that provided more information about the relative literacy of student populations than that simply given by standardized test scores. Standardized reading achievement tests have been criticized as largely atheoretical (Anderson, 1972; Curtis & Glaser, 1983; Daneman, 1982) and often fail to provide substantive information about the range of materials the students can be expected to read. A more informative and useful measure would evaluate student reading skill in terms of a model that encompasses the wide range of experiences known to influence the acquisition of reading skills. A developmental stage model, such as the one proposed by Jeanne Chall (1983), embodies this information about the broad range of reading skills, vocabulary, and range of materials characterizing each stage of development. Based on Chall's model, an index of the student reading stage was logically aggregating the student's literal and inferential reading scores and estimated vocabulary size (Hanson and Siegel, 1988b).

At this point, it is useful to discuss the specifications for the reading and vocabulary measures in more detail. The reading measure had two purposes: (1) to provide summary indices of respondent skills easily interpretable by school administrators; and (2) to provide the skill component for categorizing students in terms of Chall's model of reading development stages. Conceptually, the specifications required that the test be based on an explicit model of reading comprehension as a skills process (Calfee, 1977; Johnston, 1981). The skill model most often used in policy studies distinguishes between literal and inferential comprehension (Bormuth, 1973-74; NAEP, 1981; Thorndike, 1967). Commercially available reading tests were evaluated with these specifications in mind. Two tests emerged as candidates: the Degrees of Reading Power, a cloze-type, passage dependent measure which allows direct inferences about the types of material students can handle; and the Academic Instruction Measurement System (AIMS), a multiple-choice, multi-skill, passage-dependent, curriculum referenced measure allowing indirect inferences to the types of materials students can handle. Both tests were empirically evaluated during the course of pilot testing (see below); the AIMS was selected as the measure providing the best information for our purpose of categorizing students in terms of their stage of reading development.

The vocabulary measure also had two purposes: (1) to provide a summary index of approximate respondent vocabulary size easily interpretable by school administrators; and (2) to provide the vocabulary component for categorizing students in Chall's model. There are two basic ways to estimate vocabulary size (Lorge & Chall, 1963): (a) a specified dictionary can be randomly sampled by some rule, and students tested on that random sample; or (b), a stratified sample, in terms of frequency of occurrence, can be taken from a standard word count, and students tested on that stratified sample. In view of Chall's model, in which vocabulary shifts from frequent, concrete words to include infrequent, abstract words with development, the stratified sampling method was selected as the conceptual model for designing a vocabulary measure. In order to control, at least in part, for item difficulty, items were selected from the American Heritage Word Frequency Book (Carroll, Davies & Richman, 1968) by their frequency of occurrence and dispersion across subjects as suggested by a theory of receptive vocabulary (Stenner, Smith, & Burdick, 1983). The theory of receptive vocabulary suggests that item (word) difficulty is a function of the likelihood of the word having been encountered, and the range of contexts in which the word is likely to have been previously encountered. In order to determine the frequency strata to be sampled, estimates of vocabulary sizes by ages from Anderson and Freebody (1981) were interpolated. This procedure resulted in an estimate for adolescent vocabulary size in the 50 to 70 thousand word range. Given the over-representation of probable under-achievers in the sample, the decision was made to sample at intervals of 20,000 words, in terms of frequency of occurrence, starting with the most basic, frequent words. The practical constraints of the sampling plan allowed no more than 30 minutes for the vocabulary test; as a result, the test consisted of 25 items, with 5 items per sampled nominal frequency band. Additional details on the structure and specifications of the vocabulary test are presented in the Technical Appendices (Hanson and Siegel, 1988b). In short, a theory-driven vocabulary test was developed in order to provide stable, interpretable estimates of respondent vocabulary size to serve as an input for categorizing students in terms of their stage of reading development.

DEVELOPMENT AND FIELD TESTING OF THE *STUDENT BOOKLET*

The *Student Booklet* was refined through a set of three pilot studies. Table 6 outlines the chronological phases of development, and the goals and critical issues in each phase. In Phase I, major schooling effects studies and related longitudinal work were reviewed as previously described. The goal of Phase I was to operationalize the conceptual specifications for the instrument as previously presented in Tables 4 and 5. Based on these initial specifications, a first draft of *The Reading Biographer* (RB) was developed in the spring of 1985 (Phase II). Two issues were the focus in this first draft: (1) definition of items to adequately represent each variable; and (2) the development of behavioral response scales that define the differences of interest.

Accordingly, items were drafted to assess ten aspects of the student, home, and school history. Items relevant to the student's personal history included: (1) current activities, (2) current reading behavior, (3) personal demographics, and (4) current student-owned resources in the home. Items relevant to the school history assessed the student's (5) compensatory educational experience such as remedial reading classes taken and number of grades held back. Items relevant to the home history in this first draft included (6) current parental and home demographics such as education and language, parental involvement in the schooling process in both (7) the elementary and (8) secondary school years, (9) parental reading and non-reading behaviors, and (10) reading resources in the home. In addition, student reading and activities preference items were written as surrogate measures of reading attitude.

Table 6. Chronology of Instrument Development

Phase		**Time**	**Goal**	**Issues**
I	Literature Review	Spring 85	develop instrument specifications	identify variable classes used in policy studies to assess schooling and home effects on reading skill
II	Field Study 1 Muskogee, OK	May 85	evaluate first draft	(a) item adequacy and depth (b) response scaling
III	Field Study 2 Broken Arrow, OK	July 85	(a) evaluate second draft of SIQ (b) evaluate vocabulary subtest	(a) item adequacy and depth (b) response scaling (c) reliability; item analysis of vocabulary subtest
IV	Field Study 3 Inola	Sep. 85	(a) evaluate third draft of SIQ (b) evaluate second draft of vocabulary (c) evaluate candidate reading measures	(a) item adequacy and depth (b) response (c) reliability; item analysis of vocabulary subtest (d) relative discrimination and reliability of reading measures (e) outline algorithms for creating policy variables
V	Final Draft	Nov. 85	finalize Student Booklet	(a) final items (b) final response scales (c) vocabulary subtest (d) AIMS subtest (e) outline policy variable algorithms

Field Study 1.

The first draft of the RB, as described above, was field-tested in May, 1985, in Muskogee, Oklahoma. Sample (N=23) demographic characteristics are reported in Table 7. This sample had two important characteristics: (1) the sample was all female; and (2) the students were in a vocational program (cosmetology) and would be considered "disadvantaged" in terms of their background.

Table 7. Demographic characteristics of field test samples.

Sample:		Muskogee	Broken Arrow	Inola
		23	19	55
Sex	Male	0	-	27
	Female	23	-	27
	Missing	-	-	1
Race	Black	6	-	-
	White	13	11	39
	Am. Indian	4	6	14
	Hispanic	-	-	-
	Oriental	-	-	-
	Missing	-	-	-
Home Lang.	English	23	19	53
	Spanish	-	-	1
	Other (German)	-	-	1
Father Edu.	<HS	-	4	9
	HS	11	3	17
	HS< <BS	2	2	12
	BS	2	8	8
	>BS	-	-	1
	Missing	8	2	8
Mother Edu.	<HS	6	-	9
	HS	8	10	20
	HS< <BS	6	1	8
	BS	1	6	13
	>BS	-	-	-
	Missing	2	2	5

Three issues were of concern in this first pilot study: (1) were the intended policy variables adequately represented by appropriate items; (2) were the item response scales appropriate and meaningful to the students; and (3) could students understand and complete the questionnaire in the allotted time of one class period? Students were queried after completing the RB for their reactions, comments, and suggestions.

There were four salient results from the Muskogee pilot study. First, the student activities and resources items provided useful information that formed both logical and empirical constructs based on the pattern of responses and inter-item correlations. However, student comments indicated that some items needed re-writing for clarification. Second, the parental involvement items also formed logical, empirical constructs. But, the parental style or home environment was not represented in this version of the RB; therefore, an additional cluster of items representing the home environment was indicated. Third, the items tapping the schooling history incompletely described the student's school experience. These items simply lacked depth of coverage. Fourth, and the significant negative result, the attempt to evaluate reading attitudes through reading materials and activities preferences simply failed. Moreover, the students indicated that they had great difficulty in understanding the response scale for this group of items. Based on these results, the RB was rewritten. The development of the RB is summarized in Table 8 in which the evolution of the items is traced across successive drafts.

Table 8. Item development across versions of the *Student Booklet*

Variable			Version	
Name	Muskogee	Broken Arrow	Inola	Final
Student Demo-graphics	birthday		birthday	birthday
	grade	grade		
	sex	sex	sex	
	race	race	race	race
				birth order
Secondary School	school athletics	school teams school acad.	school sponsored activities/	school sponsored activities/ groups
		school sponsored social activities		
	homework	homework school library	homework	homework
	private lessons	private lessons	private lessons	private lessons
	organized rec. groups	organized rec. groups recreational athletics	organized recreational groups	organized recreational groups
	socializing	socializing	socializing	socializing
	hobbies	home-ec hobbies shop-hobbies collecting-hobbies craft-hobbies	hobbies	hobbies
	paid jobs	paid jobs home chores	paid jobs home chores	paid jobs home chores
	TV		TV	TV

(table continues)

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Table 8. Item development across versions of the *Student Booklet*.

Variable Name			Version	
	Muskogee	Broken Arrow	Inola	Final
Student Owned Resources In Home	own room	own room	own room	own room
	stereo	stereo	stereo	stereo
	encyc.	encyc.	encyc.	encyc.
	dictionary	dictionary	dictionary	dictionary
	>50 books in home	>50 books in home		
	calculator	calculator		
	daily newspaper	daily newspaper		
	magazine sub.	magazine sub.		
	own TV	own TV	own TV	own TV
	video game/ PC	video game/ PC		
		typewriter		
			own car	own car
			library card	library card
				own phone
Student Expectations/ Plans next			educ.plans	edu.plans
			occupational plans	plans for next fall
School Stability Elementary & Secondary attended,		6th grade school kindergarten school		school history: list of all schools, cities and states
		number of schools attended: K-6, 7-9, 10-12		

(table continues)

Table 8. Item development across versions of the *Student Booklet*.

Variable Name			**Version**	
	Muskogee	Broken Arrow	Inola	Final
Remediation K-12	held back	held back	held back	held back
	sum.school	sum. school	sum.school	sum.school
	remed.read.	remed. read.	remed.read.	remed.read.
	remed.math	remed.math	remed.math	
	remed.Eng.	remed. Eng.	remed.Eng.	remed.Eng.
		skip grades		skip grades
		see counselor		
		remed.speech		remed.speech
		suspended		suspended
		gifted/honor		gifted/honor
				bilingual classes
				read.tutor
				spec.reading classes after school
School Program Secondary School			Acad.track	Acad.track
			coursework	coursework
School Homework				elementary school (6) high school (6)
School Achievement				grades: reading in elem. school; English in secondary school
	attendance	attendance	attendance	attendance

(table continues)

Table 8. Item development across versions of the *Student Booklet*.

Variable			**Version**	
Name	Muskogee	Broken Arrow	Inola	Final
Current Parent/Home Demographics	home lang.	home lang.	home lang.	home lang.
			freq. used	freq. used
			who speaks	who speaks
	family size	family size	family size	family size
	parents		parents	
	grandparents		grandparents	
	older sibs		older sibs	older sibs
	younger sibs		younger sibs	younger sibs
	relatives/others		relative/others	
	parental educations	parental educations	parental educations	parental educations
				parental occupations
Preschool Home Environment			working mom	working mom
			childcare	childcare
			interactions with parents:	interactions with parents:
			reading	reading
			playing	playing
			books	books
			edu. TV	edu.TV
			talking	nursery rhymes
			toys	
Elementary School Home Environment				working mom
				childcare
			regular mealtime	regular mealtime
			assig.chores	assig.chores
			TV controlled	TV controlled
			homework time	homework time
			rewards	rewards

(table continues)

Table 8. Item development across versions of the *Student Booklet*.

Variable			**Version**	
Name	Muskogee	Broken Arrow	Inola	Final
Elementary School Years Parental Involvement in School	help with homework	help with homework	help with homework	help with homework
	give/buy books	give/buy books	give/buy books	give/buy books
	take to museums etc.	take to museums etc.	take to museums etc.	
	take traveling			
	teach special skills			
	attend sch.events	attend sch.events		
		attend PTA	attend PTA	attend PTA/ conf.
		attend conf.	attend conf.	
		take to library	take to library	take to library
			talk about reading	
			talk about school	talk about school
				read out loud
Secondary School Home Environment bedtime		regular meal time	regular meal/curfews times	regular mealtimes regular curfews
		assig.chores	assig.chores	assig.chores
			TV control	TV control
			regular homework time	regular homework time
			rewards	rewards
				movies controlled

(table continues)

Table 8. Item development across versions of the *Student Booklet*.

Variable	**Version**			
Name	Muskogee	Broken Arrow	Inola	Final
Secondary School yrs. Parental Involvement in Schooling	help with homework	help with homework	help with homework	help with homework
	give/buy books	give/ buy books	give/buy books	give/buy books
	take to museums, etc.	take to museums, etc.	take to museums, etc.	take to museums, etc.
	take traveling			
	taught special skills			
	attend school events	attend school events	attend school events	attend school events
	attend PTA attend conf.	attend PTA attend conf.	attend PTA attend conf.	attend PTA/ conferences
	talk about school		talk about school	
	talk about future			
		take to library	take to library	take to library
			read out loud	
			talk about books/reading	talk about books/read.

(table continues)

Table 8. Item development across versions of the *Student Booklet*.

Variable Name	Muskogee	Broken Arrow	**Version** Inola	Final
Parental Behavior	non-reading activities			
	TV		TV	TV
	church			
	visiting (no kids)			
	entertaining at home			
	family outings			
	hobbies			
	meetings			
	reading activities			
	classes		classes	
	read.books	read.books	read.book	read.books
	read. mag.	read. mag.	read.mag.	read.mag.
	writing	writing		
	homework	homework		
		reading newspaper		reading newspaper
Reading Resources In Home	mag. by type (8)[1]		mag. by type (o.e)[2]	mag.(no.)
			newspapers (no.)	newspapers (no.)
			books (no.)	books (no.)
Parental Expectations			Educational	Educational Occupational
			Grades in English reading	

(table continues)

Table 8. Item development across versions of the *Student Booklet*.

Variable Domain	Version Muskogee	 Broken Arrow	 Inola	 Final
Secondary School Student Reading Behavior	free read.	free read.books free-reading-magazines newspaper reading writing playing word games public library	free reading	free reading
	parts of newspaper read (9) books read by type (6)	parts of newspaper read (9) books read by type (14)	books read number & titles (o.e.)	
		books read in last month (number)(o.e)		books read in last year outside class (o.e)
		magazines read by type (10)		
Student Reading Attitude	educational activities preferred (6) recreational activities preferred (8)			
		perceived reading skill relative to classmates		
			perceived reading skill relative to 7 types of materials	
				attitude towards reading skill (10) attitude towards enjoyment of reading (10)

Notes: (1) (xx) refers to number of items used as indicators for this construct. (2) o.e. refers to an open-ended question.

Field Study 2.

After major revisions, the RB was pilot tested in Broken Arrow, Oklahoma, in July, 1985 (Phase III). As the demographics indicate (Table 6), this sample was more heterogeneous than the Muskogee group. The items in this version are presented in Table 8. In addition to the revised RB items, this pilot test provided a tryout of the Reading Vocabulary Test.

The results of this pilot study can be broken into positive and negative results based on evaluation of the student response patterns and inter-item correlations. There were four salient positive results in this field test. First, the parental involvement items continued to work well; the issue now was refining the items and associated scales. Student comments indicated that the frequency scale for these items was somewhat ambiguous; as a result, the scale anchors were rewritten. Second, the items intended to represent family rules in secondary school formed a logical, empirical cluster. Third, the items assessing parental reading behaviors demonstrated an acceptable degree of inter-relationship. The decision was made to refine these items and their response scale; it was also decided to use the secondary school home environment items as templates for writing elementary school home environment items. Fourth, the student reading behavior items worked well, albeit less robustly than the parental behavior items.

In contrast, there were three important negative results. First, the items intended to represent the student's home resources did not work well in this sample. Their failure was traced to an overly complicated response scale. The students were asked to indicate both possession of a given resource and the frequency of usage; this mix of information proved to be confusing according to student comments. Second, the cluster of items assessing time spent in various student activities did not exhibit the expected pattern of inter-relationships. Response scaling again seemed to be the problem. As a result, the scale was changed from a relative frequency of occurrence to a measure of hours spent per day. Third, the attempt to assess reading attitudes through preferences and a single summary item failed yet again. The items simply did not provide useful information about the affective component of reading attitude.

The results of the vocabulary subtest in this field study merit more detailed examination. The conceptual framework for the vocabulary test assumed that (a) item difficulties would increase consistently across the test, and (b) the difficulties of items within a specific frequency stratum would be more similar than between frequency strata. A plot and analysis of difficulty by item groups across drafts (Hanson and Siegel, 1988b), showed that these assumptions were not fully met. Finally, the reliability of the full test was unacceptably low (alpha=.57). Examination of the item statistics and raw responses indicated that items in the 65,000 nominal rank were ambiguous and poorly worded. Therefore the vocabulary test was extensively revised (as summarized in the Technical Appendices) in order to (a) improve test reliability, (b) improve the consistency of item difficulties, and (c) more adequately represent the levels of vocabulary.

Field Study 3.

The third major draft of the *Student Booklet* was field tested on a group of high school seniors from Inola, Oklahoma in September, 1985 (Phase IV) and the sample (N=55) demographics are reported in Table 7. There were three specific issues of concern for this pilot study: (1) the adequacy of the near-finalized version of the RB; (2) item analysis, validity, reliability, and structural analysis of the vocabulary subtest; and (3) the selection of a reading comprehension measure.

The third draft of the RB (Table 8) provided the most comprehensive assessment instrument in the developmental series. The results of the pilot study will be discussed in terms of student, home, and school attributes. Student attributes were represented by four clusters of items: (1) activities, scaled in terms of hours per day spent on that activity; (2) expectations, assessed by open-ended questions about student educational and occupational plans; (3) demographics; and (4) student-owned resources in the home.

Reasonable response patterns and inter-item correlations were obtained for these item clusters, indicating that they formed a sound foundation for aggregating them into policy variables. Home attributes were represented by eight clusters of items: (1) home/ parent demographics such as language, family size, and parental education; (2) the preschool home environment; the home/ family rules in (3) elementary and (4) secondary school; the degree of parental involvement in the schooling process during (5) elementary and (6) secondary school; (7) parental reading behavior; and (8) perceived parental expectations of the student. Evaluation of the response patterns and inter-item correlations indicated that reasonable information was being obtained, and that these clusters provided sound bases for the creation of relevant policy variables; only minor modifications to tighten the focus and clarify the response scales were indicated. The school attributes were represented by three blocks of items in this version of the SIQ: (1) the frequency of compensatory educational experiences; (2) the general curricular track of the student; and (3) an open-ended query as to current coursework. The current coursework question did not provide a complete portrait of the student's academic, reading-related curricula experience through high school; therefore, this section was subsequently expanded in the final version of the instrument.

A new measure of reading attitude was also evaluated in this version of the RB. An attempt was made to assess attitude in terms of self-perceived skill vis-a-vis seven types of age-grade appropriate reading materials. The seven types of materials formed an ordinal scale representing increasing difficulty; the student indicated agreement or disagreement with a statement about one's skill at reading each type of material. Unfortunately this approach did not yield interpretable results. Reading behavior was assessed as in earlier versions of the instrument.

At this point we turn to the measures of vocabulary size and reading comprehension. Based on the Broken Arrow field test, the vocabulary test had been extensively revised (Hanson and Siegel, 1988b). However, even after this revision, the item difficulties still did not consistently increase with decreasing frequency of occurrence across test words. The mid-range items, in the 65,000 rank, were still more difficult than desired (Hanson and Siegel, 1988b). Moreover, the variability within strata was still greater than the variability of passing rates between strata. The overall test reliability was unchanged (alpha = .56). Examination of response patterns indicated that rewriting the stems to several items, and selecting a new test word for other items, might improve the test reliability at the very least.

The other major issue in the development of the final version of the data collection instrument was the selection of an appropriate measure of reading comprehension. The general conceptual specifications for the reading measure have already been discussed. Two standardized measures, conforming to the outlined specifications, were identified as candidate measures. Both tests were skill-based, theory-driven measures that allowed inferences about the range of materials a student could be expected to read based. Subtests from both measures were administered to the Inola sample in order to empirically evaluate the relative merits of the two measures for study purposes. The Academic Instruction Measurement System (AIMS) (Charles E. Merrill Co., 1984) resulted in a roughly normal distribution (see Hanson and Siegel, 1988b). The other measure resulted in a hyperbolic distribution with a large negative skew. These relative distributions were interpreted that the AIMS provided the more discriminating assessment of student reading skills. The test possessed an acceptable degree of reliability (alpha = .67) for a 20-item subtest. Further, it best fit the adopted model of reading comprehension. Permission from the test publisher was obtained to reproduce the test for use in the final version of the data collection instrument.

FINAL VERSION OF THE *STUDENT BOOKLET*.

Based on these three field tests, the final version of the *Student Booklet* (Appendix A) was developed in Phase V. A total of 32 policy variables are represented in the *Student Booklet*. The following student variables are assessed: (1) demographic characteristics (sex, age, race); (2) birth position in the family; (3) the age at which the student began to read; (4) activities; (5) student-owned resources; (6) attitude towards reading; and (7) reading behavior. The following school variables are assessed in the final version of the *Student Booklet*: (1) elementary school experience stability; (2) elementary school program; (3) elementary school homework; (4) elementary school achievement; (5) secondary school experience stability; (6) secondary school program; (7) high school homework; (8) high school achievement; and (9) remediation across grades K through 12. The *Student Booklet* also assesses the following parent-home based variables: (1) family socio-economic status; (2) family language; (3) the preschool home environment; (4) the elementary school years home rules; (5) parental involvement in the elementary school years; (6) the high school years home rules; (7) parental involvement in the high school years; and (8) parental reading behavior. The following criterion policy effects variables are developed from the reading and vocabulary tests: (1) vocabulary level or size; (2) a raw vocabulary score; (3) literal comprehension skill score; (4) inferential comprehension skill score; (5) a raw reading comprehension score; and (6) an index of the student's reading development stage.

CHAPTER IV

STUDY PARTICIPANTS AND DESCRIPTIVE STATISTICS ON EFFECTS VARIABLES

The end result of the liaison activities and procedures was to obtain data from a set of 24 school districts in 10 states. Of this total, 23 districts had used the BRP and one had not. The one non-BRP district was included inadvertently, as discussed in Chapter III. The actual list of the participating districts and BRP schools, including the number of BRP students providing data is given in Appendix B.

A description of the study participants in terms of their gender, ethnic/racial categories, and socioeconomic status is given in Table 9. As these data show, there were slightly more males than females in the sample and considerable variability in terms of ethnicity and social class background. In terms of ethnic background, all major minority groups are represented. Collectively, they compose about 40 % of the total sample with Black students accounting for about 20 % of this total. The ethnicity percentages show one unusual number and that is the rather substantial percentage (10%) of Native Americans in the sample. Given the emphasis on disadvantaged groups, their representation was considered a positive feature of the sample. As might be anticipated, the social class background data show the largest proportions in the lowest to middle categories. This was consistent with the participants in the original kindergarten reading studies.

Overall, these descriptive statistics show the diversity expected in a large sample of high school seniors with no substantial imbalance in the numbers within the various categories. These characteristics, in terms of size and diversity, were stated objectives in the original study proposal.

Table 9. Description of participants by gender, ethnic/racial, and socioeconomic categories.

Factor		Categories	Number	Percentages
Gender	1	Females	1888	48.0
	2	Males	2049	52.0
Ethnicity	1	Asian	303	8.3
	2	Black	687	18.8
	3	Hispanic	110	3.0
	4	Native American	375	10.0
	5	All Others	2177	59.6
Social Class	1	Lowest	428	11.0
	2	Lower Middle	1070	27.5
	3	Middle	1430	36.8
	4	Upper Middle	711	18.3
	5	Highest	245	6.3

One final comment concerning the distribution of participant groups across study designs. Although the actual data tables are not presented here, the data in Table 9 were obtained for each study design category. The purpose was to assure that not all members of one group were concentrated in one design category. The results showed there was a balanced representation across all three designs with a slightly higher proportion of ethnic minorities and low SES children found in groups receiving the kindergarten reading instruction.

DESIGN A PARTICIPANTS

Design A provided two kinds of comparisons: those schools that implemented some of the Beginning Reading Program (i.e., 1 to 7 units) and those that implemented most or all of the Program (i.e., 8 to 10 units) and between Title I eligible and non-Title I eligible schools. The logic behind such comparisons was, if kindergarten reading instruction was important, than those schools providing more reading instruction should produce higher means on the effects variables than those schools implementing less. Further, the results should hold for disadvantaged (i.e., Title I Eligible) as well as for advantaged schools. This design was specified in the original study proposal as a primary means for evaluating the impact of kindergarten reading (Hanson, 1984).

In creating the school means, all schools represented by five or more students were included. Five students was considered the minimum needed in order to obtain a stable estimate of a mean value for a school. This algorithm yielded the numbers of students and schools as indicated in Table 10.

Table 10. Number of students and schools that received kindergarten BRP instruction and included in study Design A.

Kindergarten BRP Implementation Level	Title I Eligibility					
	Yes		No		Totals	
	Student	School	Student	School	Student	Schools
Some (1-7 Units)	375	17	13	1	388	18
Most (8-10 Units)	835	53	256	14	1091	67
Totals	1210	70	269	15	1479	85

As these data indicate, a total of 1,479 students, representing 23 districts and 85 elementary schools were available for this design. The vast majority of these students and schools were Title I eligible. Out of 1,479 students, only 269, or 18 percent, were from non-Title I schools.

In the original kindergarten BRP inquiries, the overall sample of participating schools included a slightly larger sample of Title I schools (54%) and pupils (53%) than would normally be found in the general population (see Hanson & Schutz, 1975 & 1976). In this study, an even larger percentage of both schools and students were Title I eligible[1]. Obtaining a large number of Title I students was considered desirable given that a major objective of this study was to examine the impact of kindergarten reading on the disadvantaged student populations.

One result of obtaining a large number of Title I students was that only one school emerged in the cell corresponding to "Some BRP/Non-Title I". One school was not considered adequate for comparisons purposes since each school mean could be based on as few as five cases. Thus, the cell mean in this case could represent a total of only 5 students. Accordingly, it was decided to base the Design A comparisons on the three categories with an adequate number of schools. Thus revised, Design A includes the following three comparison groups: (1) Title I eligibility/Some BRP; (2) Title I eligibility/Most BRP; and (3) Non-Title I eligible/Most BRP. These categories were represented by 17, 53, and 14 schools, respectively. With these sample sizes, meaningful comparison can be made between them.

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[1] Note: a school was considered Title I eligible if over one-half the students attending it were from low income families.

DESIGN B PARTICIPANTS

In addition to students who had attended kindergarten and had their elementary schooling in one of the original BRP schools, there were additional students who had clearly different kindergarten experiences. One of these groups were students who attended an elementary school which had taught reading in kindergarten, but entered _after_ kindergarten (i.e., entered in first grade or later); the other group were those students receiving both their kindergarten and elementary schooling in other elementary schools that did not offer kindergarten reading. The numbers of students, high schools, and districts represented in Design B categories are given in Table 11.

Table 11. The number of students, high schools, and districts included in the full follow-up study sample included in Design B

Kindergarten Categories	Students	High Schools	Districts
No Kindergarten BRP or BRP Schooling	1549	41	23
No Kindergarten BRP But some BRP Schooling	867	42	23
Kindergarten BRP and BRP Schooling	1534	41	23
Totals	3959	43	24

These data show the full sample is composed of nearly 4,000 students and that they represent over 40 different high schools in 24 districts. It also shows that the sample distributes itself adequately across the three kindergarten experience categories; there are substantial number of students, high schools, and districts in each category to make meaningful comparisons.

DESIGN C PARTICIPANTS

The distribution of students, high schools, and districts within the Design C categories is given in Table 12. This design places all the students who did not receive any kindergarten reading instruction into category 1. Categories 2 and 3 correspond to Some kindergarten reading (i.e., 1-7 units of instruction) and Most kindergarten reading instruction (i.e., 8-10 units of instruction), respectively. As the data indicate, the largest number of students fall into category 1, No kindergarten reading. However, the numbers in all three categories are substantial with the smallest number (n=443) being in the Some reading group. Further, the data show substantial representation of districts and high schools for all design categories.

Table 12. Description of study participants in terms of Design C categories.

Kindergarten BRP Categories	Students	High Schools	Districts
No Kindergarten BRP	2425	43	24
Some Kindergarten BRP (1-7 Units)	443	28	12
Most Kindergarten BRP (8-10 Units)	1091	37	22
Totals	3959	43	24

DESCRIPTIVE STATISTICS

As a preliminary step in the evaluation of the study results, univariate statistics (means, standard deviations, and frequency distributions) were derived for each effects variable. These were then examined to see both the overall level of performance and the extent of the variability on each within the full sample.

The means and standard deviations of the effects variables are presented in Table 13. These data confirm that there is substantial variability in the full student population on all the effects measures. Further, the mean values do not fall near either the minimum or maximum values, indicating that the variables included values that provided differentiation between them. This is further confirmed by the full frequency distributions which show good differentiation on the effects variables.

Table 13. Descriptive statistics on the effects variables for the full study sample.

No.	Name	Mean	S.D.	N	Min.	Max.
1	Comprehension	12.8	4.0	3945	0	19
2	Vocabulary	17.1	3.7	3958	0	24
3	Reading Stage	2.7	1.0	3943	1	4
4	Illiteracy	.15	.36	3943	0	1
5	Attitude	4.3	1.3	3796	2	6
6	Books Read	2.4	1.1	3959	0	4
7	Time Reading	1.6	1.1	3959	0	4
8	High Sch. Track	2.3	.6	2777	1	3
9	Remediation	.4	1.1	3828	0	9
10	Achievement	5.3	1.6	3039	2	8
11	Social Class	2.8	1.1	3884	1	5
12	Parents Education	5.9	2.6	3798	2	12

Table 14 presents the correlations among the effects variables. As expected, the four measures of reading competency, comprehension, vocabulary, reading stage, and illiteracy, are highly intercorrelated. The reading attitude, books read, and time spent reading variables all have moderate correlations with each other but low relationships to the four competency variables, indicating that attitude/behavior is not highly related to measured competence in this group. Remediation has very low negative relationships to all variables. By comparison, both of the other two variables in this cluster, achievement (grades and attendance), and high school track, have substantial relationships to each other and to all measures of reading competence. Finally, the measures of social class and parents education show substantial relationships to each other but only moderate positive relationships to the other effects variables. The highest relationship is +.24 between social class and reading vocabulary, reading stage, and high school track.

Collectively, these correlations confirm most expectations. The expected high interrelatationship among reading competence measures, with low to moderate relationships between them and the other variables, is consistent. There are several notable exceptions. One exception is understandable since the variable is remediation, which shows a modest negative relationship to the other positively related variables. The second exception is the books read and time reading variables Here the expectation was that there would be moderate positive correlations with the reading competence variables. The results show low to no relationship between these and the reading competence variable. However, time spent reading, books read, and attitude toward reading all moderately related to each other. This was expected and is the reason they are in the same variable cluster.

Table 14. Correlateion Between the effects variables (decimals omitted).

Variable Name	1	2	3	4	5	6	7	8	9	10	11	12
1 Comprehension	1.0											
2 Vocabulary	64	1.0										
3 Reading Stage	82	81	1.0									
4 Illiteracy	-59	-65	-71	1.0								
5 Attitude	.29	31	30	-16	1.0							
6 Books Read	09	12	11	-02	49	1.0						
7 Time Reading	06	09	06	-03	38	38	1.0					
8 Remediation	-09	08	-09	06	-12	-15	-16	1.0				
9 Achievement	41	38	41	-23	34	17	11	-22	1.0			
10 Hi School Track	39	38	39	-22	28	13	06	-51	46	1.0		
11 Social Class	19	24	24	-14	08	02	05	-06	18	23	1.0	
12 Parents Education	03	04	06	01	03	03	00	-02	09	17	70	1.0

CHAPTER V

ANALYSIS OF STUDY EFFECTS USING THE THREE STUDY DESIGNS

The results of the various analyses carried out for the three study designs are presented and discussed in this chapter. The focus of these analyses in on evaluating the effects variables described previously. The general strategy adopted was to evaluate each effects variable at least once within each study design using standard analysis of variance procedures. The goal was to see if significant statistical differences emerged between the variable means design categories. The results for each design are then evaluated collectively, in terms of their implications for the study conclusions regarding the effects of kindergarten reading instruction.

DESIGN A: COMPARISON OF EFFECTS BETWEEN SCHOOLS

Study Design A provides a rigorous test for the effects of early reading because it includes data only on those students who actually received kindergarten reading instruction and looks for differences between those receiving "Some" versus "Much" instruction. The student data on the effects variables were aggregated to provide elementary school means for the 84 different elementary schools represented in the three design categories: (1) Partial Kindergarten BRP/Title I Eligible (n=17); (2) Full

Kindergarten BRP/Title I Eligible (n=53); (3) Full Kindergarten BRP/Non-Title I Eligible (n=14).

Using these three comparison categories, several results were anticipated. First, it was expected that mean scores would range from low to high depending on the relationship of the variable to the kindergarten BRP implementation level. For example, if the variable was positively related to the number of BRP units completed, then those schools implementing more of the BRP should have a higher mean than those implementing less. Secondly, it was anticipated that mean scores for schools serving disadvantaged populations (i.e., Title I schools) would be lower than for those that did not. Hence, those schools in category three, Full Kindergarten BRP/Non-Title I Eligible, were expected to have the highest means. The results of these analyses are presented in Table 15. These analyses were taken from the final grant report (Hanson, Siegel, and Broach, 1986) Note that they include only some of these effects variables described previously.and evaluated for Designs B and C As the discussion indicates, these differences proved not to be critical since the focus is on the reading competence variables, which include three of the four effects measures

Table 15. Summary of the ANOVA results on the effects variables with school level means in the three kindergarten BRP implementation/Title I categories .

	BRP Implementation Level and Title I Eligibility			
Effects Variables	Part BRP/ Title I n=17 (1)	Full BRP/ Title I n=53 (2)	Full BRP/ Non-Title I n=14 (3)	Significance Level
Current Reading Competency				
Comprehension	12.8	13.0	14.2	.03
Vocabulary	7.8	8.2	8.9	.02
Overall Reading	2.7	2.8	3.1	.02
Reading Attitude & Behavior				
High School History & Status				
Remediation	.20	.21	.17	N.S.
Grades and Attendance	5.1	5.4	5.6	N.S.
High School Track	2.3	2.3	2.5	.01
Family Background				
Socioeconomic Status (SES)	2.7	2.8	3.1	.02

Note: This table is taken form the original report and does not include the full set of effects variables which are presented for Designs B and C.

The actual school means for each of the effects variables were computed using a one way ANOVA (SPSSx). This analysis evaluated the differences in the mean scores among these three categories of comparison and was repeated for each of the effects variables. These results are summarized in Table 15

The results indicate that all three of the effects variables measuring current reading competency show statistically significant mean differences among the three Design A categories. Further, the means show a pattern of regular increases across the three design categories which correspond to expectations. These results suggests that (1) the differences in mean reading scores are due both to BRP implementation and Title I eligibility and; (2) receiving full versus partial kindergarten reading was positively related to the reading competencies of students as young adults.

There were no variables caculated in the category of "Reading Attitude and Behavior" in the Final Report for this design. However, in the category of "Schooling History and Status", one of the three measures provides a statistically significant difference. This is the variable measuring the high school curricular track in which the students are placed for current instruction; the highest value being for the college track and the lowest for the vocational. Note that the major difference here is between the means of categories 1 and 2 versus those in category 3. Note also that the schooling history variables of Remediation and Grades and Attendance do not show statistically significant results. However, for both of these variables, the means followed the anticipated pattern of change.

One final variable that emerged as significant in these analyses is Socioeconomic Status (SES). Here the major distinction is between the means for the Title I schools as compared to the means for non-Title I schools. This would be expected since SES level is a good indicator of family income, which is the basis for Title I eligibility.

To summarize, the school level analyses show clearly significant differences among the three kindergarten BRP comparison categories on the three important measures of current reading competency: reading comprehension, reading vocabulary, and reading stage. Further, these differences correspond to study expectations based on the Title I and implementation factor outcomes from the original data gathered in 1973-74. The other effects variables also show mean differences which correspond to expectation. However, with the exception of high school curricular track and socioeconomic status, these differences are not statistically significant.

These results clearly provide support for kindergarten reading. Those children receiving the full, as opposed to partial implementation of the Beginning Reading Program, showed significant differences on all the major measures of reading competency. Further, these differences appear to hold up well, even within the poorest schools. Note the clear pattern of mean differences between the first two categories in Design A. Here schools in both categories are Title I eligible and serve disadvantaged students. Those receiving most or all of the BRP show consistently higher reading scores than those receiving only part of the Program.

Finally, the consistency in both the significant differences found and the pattern of mean differences are noteworthy given the small numbers on which these results are based. As indicated in Table 15, the number of schools represented in each category are 17, 53, and 14, respectively.

DESIGN B: COMPARISON OF EFFECTS BETWEEN STUDENT SUBGROUPS

Further information about the impact of kindergarten reading on the effects variables is found by examining data on the effects variables in Design B. In this design, the primary comparison was among three groups of students: (1) those who did not attend a BRP elementary school, 2) those who entered and attended a BRP elementary school after kindergarten (i.e., first grade or later) and, (3) those who participated in the kindergarten BRP and attended a BRP elementary school.

Of special concern was to see if the overall levels of attainment of the students who had received the kindergarten BRP were comparable to those students who (1) had clearly different kindergarten experiences but otherwise comparable schooling histories (i.e., attended the same elementary school but not in kindergarten) and; (2) differed in both their kindergarten and other elementary schooling experiences (i.e., attended other elementary schools). Once again, differences among the three Design B groups on the full set of the effects variables discussed earlier, were obtained and evaluated using ANOVA procedures. A summary of these analyses is presented in Table 16 with the actual computer tables given in Appendix C

The results show significant mean differences on all four reading competency variables were found among the three groups. Further, when one looks at the means for each of the three comparison groups, a consistent source for these differences emerges; it is between the children who received kindergarten reading (category 3) as compared to the children in the other two categories (i.e., categories 1 and 2). That is, the students who attended the BRP schools and received the BRP instruction in kindergarten attained clearly higher scores on all four measures of reading competency than those who either entered the BRP school after kindergarten or attended another elementary school that did not offer the kindergarten BRP. Note also that the mean scores of the students in the two other groups (i.e., 1 and 2) are nearly identical. This further supports the contention that the differences observed were due to the kindergarten reading experience rather than to some other factor.

Table 16. Summary of the ANOVA results and the effects variables means for the Design B kindergarten and schooling categories.

	Kindergarten BRP Experience Categories			
Kindergarten Elem. School	No BRP/ No BRP School	No BRP/ & BRP School	BRP/ & BRP School	ANOVA Sig. Level
Effects Variables	(n = 1516) (1)	(n = 846) (2)	(n = 1409) (3)	
Current Reading Competency				
Comprehension	12.6	12.7	13.2	.00
Vocabulary	17.0	16.9	17.4	.00
Overall Reading	2.7	2.7	2.8	.00
Illiteracy	.17	.18	.11	.00
Reading Attitude & Behavior				
Attitude	4.3	4.3	4.4	.34
Time Spent Reading	1.5	1.6	1.6	.01
Books Read this Year	2.4	2.4	2.4	.58
Schooling History & Status				
Remediation	.55	.28	.23	.00
Grades and Attendance	5.2	5.2	5.4	.00
High School Track	2.3	2.2	2.3	.24
Family Background				
Socioeconomic Status	2.9	2.8	2.7	.00
Parents Education	2.7	2.5	2.4	.00

Among the effects variables in the second cluster, "Reading Attitude and Behavior", only one difference emerged as significant. The students in both groups who received the BRP instruction reported spending more reading (in hours per week) outside of school; this was not expected but may be an artifact of how this variable was measured. In the "Schooling History" cluster, only High School Track did not emerge as significant. The two other variables, measuring the amount of remedial instruction received and the grades and attendance pattern in school, respectively, both showed significant differences in the anticipated direction. Clear mean differences favoring those having the kindergarten reading, as compared to the students in the other two categories,emerged on both of these important variables of school success.

Finally, a significant difference was found among the students in the three comparison groups in terms of the social class status of their families and parents education. However in both cases, it is in a direction opposite from that suggested by the other reading competence differences. Students who received the kindergarten reading instruction came from families with a lower social class background than those who did not. This is an astounding result but consistent with the fact that most districts chose to implement the BRP in their poorest schools. Not only did the students who received formal reading instruction in kindergarten show a clear pattern of superior current reading skills, higher grades and attendance in school, and having received much less remedial instruction in both elementary and secondary school but, they were also from families with a significantly lower SES and parent education rating than those in the other two comparison categories.

This type of finding was considered extraordinary and therefore required further confirmation. Accordingly, additional analyses were carried out to examine the data at a more detailed level. In a second analysis, the effects variables on students in each of the three Design B kindergarten experience categories were broken down by high school within a two way, main effects, ANOVA design. The purpose of using the high school as an additional main effect was not to see if differences between them would be significant; it was clearly expected that there would be such differences. Rather, it was to see if the differences observed among the three groups in Design B on the dependent variables would still be significant after controlling for differences between districts and high schools. In essence, it was to further confirm that the differences observed were not due to some unusual sampling characteristic. A summary of these ANOVA's is presented in Table 17 with the full ANOVA results given in Appendix C.

Table 17. Summary of two way ANOVA's on each effects variable with Design B being one factor(F_1) and the high school being the other (F_2)(See Appendix C for full ANOVA tables).

	Design B (3)		X High School (43)	
Effects Variable	F	Signifiance	F	Signifiance
Current Reading Competence				
Comprehension	6.2	.00	8.3	.00
Vocabulary	9.2	.00	11.3	.00
Reading Stage	5.9	.00	10.0	.00
Illiteracy	13.5	.00	8.0	.00
Reading Attitudes & Behavior				
Attitude	.6	.58	1.7	.00
Books Read this Year	1.8	.17	1.2	.23
Time Spent Reading	2.7	.08	2.0	.00
Schooling History				
Remediation	3.0	.05	1.6	.01
Grades & Attendance	3.1	.04	2.5	.00
High School Track	6.5	.00	5.6	.00
Family Background				
Socioeconomic Status	.18	.19	7.2	.00
Parents Education	5.1	.00	6.2	.00

For each of the individual variables, a two way ANOVA is given with Design B as the first factor and the student's high school as the the second main effect in the model. As anticipated, the data in Table 17 show that for nearly every variable, significant differences were found associated with high schools. It also shows that all the findings for the effects were confirmed, with one minor exception, time spent reading. Particularly noteworthy is the fact that all reading competence measures continued to show significant effects due to Design B categories and favoring kindergarten reading. In addition, one effects variable, High School (academic) Track, which did not show a significant difference when evaluated alone, showed a significant difference favoring early readers in the two way ANOVA. One additional point about the data in Table 17 concerns the Socioeconomic Status variable. Note that the differences are not significant for the Design B factor, although it is significant for the High School factor. This is what would be expected since SES differences are usually associated with high schools attendance centers. In summary, these analyses add substantial further support to the earlier conclusions about the impact of early reading. They show that the differences observed in the key effects variables emerge even when controlling for differences between high schools and districts.

DESIGN C: COMPARISON OF EFFECTS BETWEEN STUDENT BRP GROUPS

Design C comparisons provide a further examination of the differences among students who received kindergarten reading. Recall that the first category in this design includes all students who did not receive any kindergarten reading instruction, regardless of where they attended elementary school. In the second category are all students who attended elementary schools implementing part of the reading Program (i.e., 1-7 units) and the third category includes those completing most or all of the Program (i.e., 8-10 units). In this design, category 1 (None) can be viewed as a large, diverse baseline category composed of over 2,400 students. The second (1-7 units) and third (8-10 units) categories then provide some or all of the treatment. This is in contrast to Design B, where the expectation was that the third category (which included all the kindergarten BRP students) would differ from categories 1 and 2, which served as dual baseline groups.

The results of this analysis, including the effects variable means and one way ANOVA summaries, are given in Table 18. These results show that the pattern of mean differences and ANOVA results for the four reading competence measures are significant and show the expected pattern of differences. Similarly, the important schooling history variables of remediation and achievement follow this pattern. Only High School Track and the Reading Attitude and Behavior variable did not show significant differences in these analyses. By contrast, the Socioeconomic and Parents Education variables were significant, once again, not favoring the kindergarten reading students. Collectively, these results are consistent with those presented previously for Design B and show the major effects variables to be sensitive to differences in the amount of early reading provided to students. To examine the data further, the two way ANOVA analysis was used with the high school as one factor and Design C as the other factor. The results are reported in Table 19. Once again, the high school factor emerged as a significant main effect for all the effects variables but one. More noteworthy is the fact that all the effects variables which emerged as significant in the one way ANOVA (Table 18) were also significant in this analysis. These included the four measures of reading competence and three variables measuring schooling history. Collectively, these Design C results extended the earlier results. They show, not only that there are effects associated with kindergarten reading, but also among the student groups defined by the amount of kindergarten reading instruction. Hence, **not only is kindergarten reading important, but the more reading instruction, the better**. Put another way, the effects variables, measured twelve years after the students' kindergarten experience, showed reliable differences corresponding to differences in the amount of reading instruction the students received in kindergarten.

Table 18. Summary of the ANOVA results and the effects variable means for Design C categories based on the elementary school attended and amount of kindergarten reading instruction received.

School	Non-BRP	BRP	BRP	ANOVA Sig. Level
Effects Variable BRP	None	1-7 Units	8-10 Units	
Current Reading Competence				
Comprehension (RDGSCR)	12.6	12.8	13.3	.00
Vocabulary (VOCSCR)	17.0	17.1	17.5	.00
Reading Stage (STAGE)	2.7	2.7	2.8	.00
Illiteracy (PSTAGE)	1.17	.14	.10	.00
Reading Attitudes & Behavior				
Attitude (ATT)	4.3	4.4	4.4	.36
Books Read this Year(NBOOKS)	2.4	2.4	2.4	.59
Time Spent Reading (READING)	1.6	1.6	1.6	.35
Schooling History				
Remediation (REMED)	.45	.26	.21	.00
Grades & Attendance (ACH)	5.2	5.3	5.4	.00
High School Track (HSTRAK)	2.25	2.33	2.28	.11
Family Background				
Socioeconomic Status (SES)	2.9	2.7	2.8	.01
Parents Education (TED)	2.6	2.5	2.4	.00

Table 19. Summary of two way ANOVA's on each effects variable with Design C being one factor(F_1) and the high school being the other (F_2)(See Appendix C for full ANOVA tables).

	Design C (3)		X High School (41)	
Effects Variable	F	Signifiance	F	Signifiance
Current Reading Competence				
Comprehension	6.4	.00	8.2	.00
Vocabulary	8.9	.00	11.2	.00
Reading Stage	6.2	.00	9.9	.00
Illiteracy	13.6	.00	8.0	.00
Reading Attitudes & Behavior				
Attitude	.1	.89	2.4	.00
Books Read this Year	1.4	.25	1.2	.23
Time Spent Reading	1.9	.14	1.9	.00
Schooling History				
Remediation	2.9	.05	1.6	.01
Grades & Attendance	3.4	.03	2.5	.00
High School Track	5.7	.00	5.5	.00
Family Background				
Socioeconomic Status	.76	.47	7.3	.00
Parents Education	3.7	.03	6.1	.00

KINDERGARTEN READING AND ADULT LITERACY

One final set of analyses using Design B and Design C categories were carried out to further examine the differences obtained among students in the racial/ethnic, gender, and social class groups. One way ANOVA's were computed for each group and design on each dependent variable and the means were plotted. Close examination of these data revealed that there was a remarkable degree of correspondence between the results obtained within each of the biosocial variables to those for the full sample. Within nearly every category of these biosocial factors, **the means for the students who received the kindergarten BRP were clearly higher**. It made little difference how the sample was dissected, the differences remained.

Because of the space limitations, all of these analyses are not reproduced for this report. However, one set of analyses on the illiteracy variable, derived from Chall's reading stage, are presented. Recall that the Chall Reading Stage variable places each student into one of five categories by utilizing the combination of their reading vocabulary and performance on two types of reading comprehension items (literal and inferential). To create the illiteracy variable, those students in the lowest two categories, which correspond to functioning at or below a standardized fifth grade reading level (i.e., functional illiteracy for a high school senior), received a 1. Thus the illiteracy variable simply indicates whether or not a student is in either of these two categories. When it is summarized for a student group, the mean presented is the proportion of students in each group in these low categories; that is, the percent of readers who are clearly at, or below, a level of functional illiteracy as high school seniors.

The results of the analysis for this variable are presented in Table 20 and show the practical impact of kindergarten reading instruction on this one global measure of adult literacy. The entries in this table indicate the percentage of students in each category who were reading at or below the 5th grade levels as seniors in high school; these data are given by ethnic/race, gender and social class populations.

Perhaps more directly than any other analysis, these data show the practical effects associated with kindergarten reading instruction. Students who learned to read in kindergarten fared better in all groups than those who did not. In virtually every category the data show the same pattern of results; **the percentage of functionally illiterate students is lower for groups who participated in the kindergarten reading program.** Depending on the specific group, these differences varied from 2% to as much as 16%. Note, however, that the results for each group consistently favor the kindergarten readers. As Table 20 indicates, in the full sample, there were about

Table 20. Percent of students in each kindergarten BRP experience comparison category who can be classified as functionally illiterate as seniors in high school (i.e., reading at or below the 5th grade level).

Biosocial Variables	No BRP/ No BRP School 1	No BRP/ BRP School 2	BRP/ BRP School 3	Overall Percentages
Ethnic Background				
Asian	13	10	01	9
Black	44	39	28	37
Hispanic	35	31	26	31
Native American	20	22	18	20
Others	8	8	6	7
Gender				
Female	15	17	11	14
Male	18	18	11	15
Socioeconomic Status				
Low	21	25	14	19
Medium	18	16	11	15
High	7	10	5	7
Overall	17	18	11	15

8 % fewer of these poor readers among students who had the kindergarten reading program as compared to those who did not. Put another way, **there were about one-third fewer functionally illiterate high school seniors among those who received reading instruction in kindergarten as compared to those who did not.**

Couple these results with the fact that the schools which taught reading in kindergarten included more students from disadvantaged backgrounds (lower SES) and these results are even more astounding. For these students to be even comparable to higher SES groups, who did not receive kindergarten reading instruction, would be a significant accomplishment. The fact that they read better overall and that there were substantially fewer students in the functional illiterate category is extraordinary.

A conservative estimate of this effect for each group can be obtained by comparing each group's percentage of low-level readers to the average for that row (last column). These data are summarized in Figure 3 and show that these differences vary form 1 to 9 percent, depending on the specific group. The largest percentages are in the groups that are typically from disadvantaged backgrounds and who usually have high illiteracy rates as adults. These include those students in the ethnic minorities, males, and from lower SES backgrounds. These are exactly the groups that it was anticipated would be most likely to show effects in the original proposal (see Hanson and Siegel, 1988b). However, the data also show that the effects extend beyond these groups to students in virtually all categories. In terms of the proportion of poor readers within any given category, the kindergarten reading experience was at least as valuable for the advantaged as for the disadvantaged populations. Together, these results clearly show that the kindergarten reading experience was advantageous in reducing the number of poor readers in all groups. The disadvantaged showed the greatest percentage differences, but they also had the largest percentages of students in the lowest reading category.

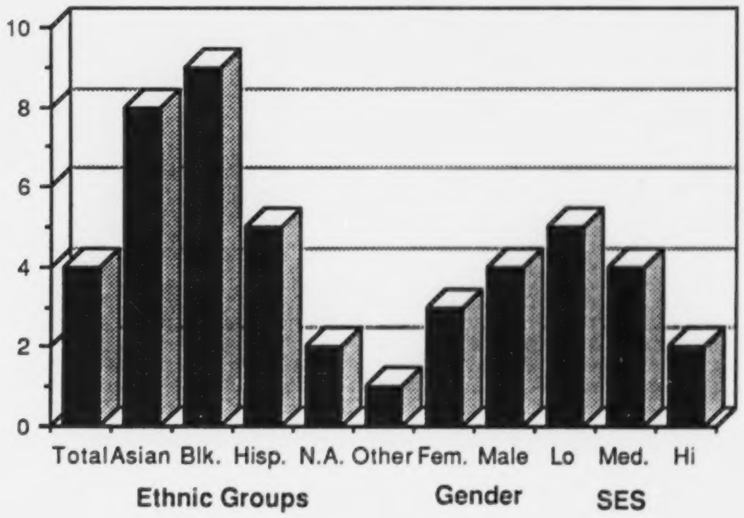

Figure 3. Illustration of the mean differences in percent between the overall average and those students who participated in the kindergarten Beginning Reading Program by ethnic group(Asian, Black, Hispanic, and Native American), social class, and gender.

CHAPTER VI

SUMMARY, POLICY IMPLICATIONS, AND CONCLUSIONS

This study set out to examine a most controversial school policy issue: whether it is more advantageous to begin formal reading instruction in kindergarten or to delay it until first grade. To accomplish this task, the project utilized an extensive set of data gathered from a large national sample of schools that implemented the Beginning Reading Program in their kindergarten classes during the 1973-74 school year. In 1986, twelve years later, a portion of the original population, along with other students who had different kindergarten experiences, completed the *Student Booklet*, an instrument designed to measure current reading skills and other potential effects variables. A special concern of the research was to see if such instruction had any impact on disadvantaged students. Such students are always designated as having the lowest literacy rates as well as the highest school dropout rates.

At a conceptual level, the notion that learning to read earlier in school would impact subsequent reading skill makes excellent sense. It is supported by a number of motivational, learning, and social competence theories. These theories suggest that being able to gain competence in a critical skill like reading should be very important to a child's self-confidence and subsequent learning in any area. It would also be consistent with current knowledge about socialization processes that occur in schools which suggest that schools label and sort children very early into the "competent" and "less competent" categories and that these labels persist into adulthood. In a skill area as central to schooling success as reading, being labeled as competent during the early school years should have a lasting, positive impact. Further, recent studies have shown that early reading ability consistently correlates with later reading ability (Williams and Silva, 1985, Hays and Cangelosi, 1985). That is, students who are good readers at an early age (e.g., kindergarten and first grade) are better readers in later grades.

On the other hand, some very persuasive doctrine based on old research studies and the philosophies of certain developmental theorists espoused by various professionals, both inside and outside of schools, still caution against teaching reading in kindergarten. A major contention of theirs is that learning to read before the age of 6 1/2 leads to initial frustration and anxiety that will result in long-term, negative effects for all students. To address this contention empirically required locating comparative data on a large, national sample of children who had been systematically taught to read in kindergarten, measuring their reading skills and attitudes as seniors in high school, and comparing them to other seniors who had different kindergarten experiences but comparable elementary schooling experiences.

Dismissing the formidable logistics involved in successfully carrying out such research, to detect significant effects, even if they existed, would be virtually inconceivable after twelve years. This view is consistent with the major schooling effects studies of the 1960's and early 70's which show schools to have little differential effects on students -- even when the time frame between the intervention in question is short and the effects being measurement are very specific (e.g., Hanson, 1986). Thus, finding any effects for an intervention which occurred more than 12 years earlier, which was of relatively short duration (20-30 minutes per day for 25 weeks) is literally like finding the proverbial needle in the haystack. Indeed, even finding the individual students who had taken part, given the transient nature of families today and limited school records, would be a challenge in itself.

In spite of these obstacles, plus the additional ones mentioned earlier that were associated with the timing and funding of the project, the study was successfully completed. More significantly, the results obtained are so astounding as to fly in the face of all conventional wisdom about schools, programs, and particularly, current policy regarding teaching reading in kindergarten. In addition to showing a positive effect on such school related factors as grades, attendance, and the need for remedial instruction, this study

demonstrated a remarkably clear and consistent pattern of increased reading competency for high school seniors as a result of receiving formal reading instruction in kindergarten. These results held up across virtually all groups of students, within as well as between districts, despite the fact that students in the comparison groups were from higher SES families. Studies which show that an intervention has substantial short term effects are unusual; those showing effects over a very long period of time are even more rare. But a study that shows both long-term positive effects and positive effects in groups from significantly lower socioeconomic levels are absolutely astounding.

How can such effects be understood? A central question is whether the results obtained were due to the kindergarten reading instruction alone or to a combination of the instruction and the "halo" effect that having early reading skills provided. Students entering first grade with the ability to read may be held in higher esteem than those who cannot and, thus, be labeled as "smart" by parents, teachers, and peers. Achievement-motivation research has documented the effects that self-concept and labeling has on students; hence, this kind of labeling may result in a positive self-fulfilling prophecy. Also, studies of parental impact on early reading suggest that gaining competence in reading at the outset of formal schooling, when parental interest in their child's progress is highest, may engender long-term family support and encouragement for the child that would not otherwise occur.

It should be noted that such convincing evidence favoring kindergarten reading instruction was totally unexpected. In the original grant proposal, the expectation was that the early reading experience might show some positive, long-term impact for disadvantaged groups. This modest expectation was in direct contrast to the prevailing notions of early childhood specialists who, almost universally, have cautioned against providing formal reading instruction to children prior to the age of 6 1/2 for fear of the long-term negative effects it would have on their reading skills and attitudes.

This study clearly turns this long-standing educational maxim into a myth. Not only did the disadvantaged students benefit from the kindergarten reading instruction, but so did the advantaged groups. Perhaps even more astounding is the fact that, collectively, the high school seniors who participated in the kindergarten reading program were from lower socioeconomic groups than those who did not. This was consistent with the earlier evaluations of the kindergarten reading installations which showed that most districts placed the program in schools with the lowest reading levels... those that typically served disadvantaged populations. Thus, in spite of an overall lower SES level, the students who received the kindergarten reading program still outperformed the higher SES students who did not! When was the last time anyone saw test results showing a lower social class group outperforming a higher social class group on a norm-referenced test of reading achievement? Further, when have such significant differences been directly linked to an educational intervention provided by schools?

POLICY IMPLICATIONS

What then are the policy implications for schooling practices and future research in this area? One policy implication can be stated quite directly. Having a well-developed reading program in kindergarten, that is effectively and humanely implemented, is an excellent policy which should yield positive long-term benefits for all students, regardless of their background characteristics. Accordingly, support should be provided for schools to begin formal reading instruction at the kindergarten level in a manner consistent with the implementation methodology and instructional strategies of the Beginning Reading Program. In this regard, it is important to recall that the kindergarten reading experience required between 20-30 minutes of group instruction time per day for a period of about 25 weeks. Thus, it did not preclude any of the other developmental skill-building tasks and play activities which usually occur as part of a traditional kindergarten program. This should make reading instruction more appealing to those concerned about maintaining a full kindergarten curriculum.

The study also has important policy implications for future research on kindergarten reading as well as for issues related to schooling effects and evaluation methodology. One recommendation for future research is to see if these results can be replicated. Such replication and extension of study results is always important in behavioral research, and especially when the findings fly in the face of conventional wisdom about phenomenon. One of the many innovative features of the original BRP inquiries was the longitudinal nature of the inquiry which facilitates replication. Since the original inquiries involving the BRP continued from 1972 through 1978, there are still opportunities for replicating the present study (e.g., Lehman & Hanson, 1981).

The current study, though simplistic when compared with the full set of possibilities that such a methodology would present, could also be used to define schooling effects more percisely than before. One example would be to show how schooling effects can be translated directly into cost information by comparing groups in terms of the amount of remedial education required by students across all three categories. Coupled with information on the costs of remedial efforts, the effects of kindergarten instruction can be translated into a direct cost-benefit figure. Likewise, such figures can be generated using the illiteracy information. How much does it save society when the proportion of illiterate high school seniors are reduced by one-third?

Although it was noted that schools are generally not able to provide data on the programs and experiences of students who progress through them, the study also found that such a capability is emerging rapidly in some districts. Schools and other social service institutions are improving in their ability to handle information. Accordingly, better and more complete resources for policy information on schooling should emerge in the near future. Such information can then be used to routinely monitor the long-term effects of given practices and programs such as kindergarten reading both within and across districts.

Additional research needs to be carried out using new data sources and evaluation methods. One promising approach is through the ongoing compilation and analysis of data within schools, rather than single one-shot studies such as that carried out here. Programs, people, processes, and their interrelations are dynamic, not static, entities. Hence, policy researchers, school administrators, and other consumers and producers of educational policy need to constantly monitor them. This perspective, in particular its utility for understanding the costs and effects of school programs, has been developed elsewhere (Hanson, 1986).

Further analyses of the KFS data have already been carried out in a dissertation study by the project assistant (Siegel, 1987). This research provides insights into the particular home, school, and extracurricular experiences of students, from preschool through high school, that were found to be related to the reading achievement of young adults. Coupled with the further analyses planned for this extensive KFS database, additional understanding of the observed effects should result.

CONCLUSIONS

The major findings of this research can be stated in a single sentence: the students who learned to read in kindergarten were found to be superior in reading skills and all other educational indicators as seniors in high school. Further, the extraordinary findings of superior reading competency being associated with having received reading instruction in kindergarten, examined across districts and schools, as well as ethnic, gender, and socioeconomic groups, provides the strongest possible support for early reading programs. Given that the results were obtained from a variety of analyses, the findings suggests that there is absolutely no evidence of any negative effects from learning to read in kindergarten and, thus, any district which does not currently have a policy of teaching reading in kindergarten should be ready to present new and compelling reasons to support that policy -- beyond the old studies and notions that it has long-term, adverse effects on students' reading skills, attitudes, and behaviors.

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APPENDICES

Appendix A

Student Booklet

21 129

READING FOLLOW-UP STUDY
STUDENT BOOKLET

Please print your name ON THE LABEL at the top left hand corner of this booklet. This Student Booklet is divided into two parts. Part I has 45 vocabulary and reading questions. Part II has 38 questions about you, your family, and school. Read the directions carefully for each section and answer each question as accurately as possible. In Part I, you should mark an X in the box next to the best answer. In Part II, there are no right or wrong answers. For most questions in Part II, you will need to put an X in the box for the response that you select. Some questions, however, will require that you write in your answer on a blank line. PLEASE PRINT. If you have any problems or questions, raise your hand for assistance.

The reading passages and questions on pages 4 to 7 in this student booklet are taken from the ACADEMIC INSTRUCTIONAL MEASUREMENTS SYSTEM (AIMS). They are copyrighted and used with the permission of CHARLES E. MERRILL PUBLISHING

14. The man **obstructed** justice.
☐ enforced ☐ hindered ☐ summarized ☐ insulted ☐ none of the above

15. The **precipices** kept them from going on.
☐ moors ☐ cascades ☐ bluffs ☐ glaciers ☐ none of the above

16. The show will **debut** next week.
☐ premiere ☐ culminate ☐ promote ☐ pervade ☐ none of the above

17. The doctor was considered very **knowledgeable**.
☐ thorough ☐ informed ☐ unprepared ☐ ignorant ☐ none of the above

18. The statement made a **mockery** of justice.
☐ tribute ☐ analysis ☐ portrait ☐ specimen ☐ none of the above

19. The student received a **subsidy**.
☐ classification ☐ assignment ☐ grant ☐ summary ☐ none of the above

20. Mom waited for the kids to stop **wrangling**.
☐ scrambling ☐ arguing ☐ demanding ☐ sobbing ☐ none of the above

21. The woman was **convalescing** at home.
☐ relaxing ☐ weakening ☐ recovering ☐ dying ☐ none of the above

22. The room was **hygienic**.
☐ messy ☐ sanitary ☐ neat ☐ filthy ☐ none of the above

23. He liked to **nettle** people needlessly.
☐ strangle ☐ evade ☐ provoke ☐ unify ☐ none of the above

24. The students were in a **quandary.**
☐ dilemma ☐ quagmire ☐ depression ☐ confrontation ☐ none of the above

25. The tool was **unwieldy**.
☐ cumbersome ☐ expedient ☐ temperamental ☐ resplendent ☐ none of the above

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PART I
VOCABULARY

DIRECTIONS: Mark an X in the box next to the answer that means the same as the underlined word. Mark "none of the above" if the other answers do not seem correct to you

1. The witness gave his **account** of the accident.
☐ admission ☐ description ☐ dismissal ☐ defense ☐ none of the above

2. The soup started to **boil.**
☐ bounce ☐ chill ☐ freeze ☐ bubble ☐ none of the above

3. The soldiers **invaded** the village.
☐ avoided ☐ honored ☐ attacked ☐ departed ☐ none of the above

4. The businessman made an important **judgement**.
☐ error ☐ bargain ☐ association ☐ decision ☐ none of the above

5. The building was in an older **zone** of the city.
☐ district ☐ downtown ☐ margin ☐ woodland ☐ none of the above

6. The artist died in a **garret.**
☐ stairway ☐ loft ☐ corridor ☐ warehouse ☐ none of the above

7. Joe was a **regular** at the cafe.
☐ foreigner ☐ specialist ☐ colleague ☐ newcomer ☐ none of the above

8. The earrings were **tarnished.**
☐ broken ☐ glossy ☐ stained ☐ inexpensive ☐ none of the above

9. The radio station played **vulgar** songs.
☐ dainty ☐ harmonious ☐ gross ☐ unpopular ☐ none of the above

10. The conductor **yanked** the emergency signal.
☐ hurled ☐ jerked ☐ thumped ☐ towed ☐ none of the above

11. The President's **endorsement** was important.
☐ criticism ☐ suspicion ☐ compromise ☐ prejudice ☐ none of the above

12. The **frenetic** salesman made his final offer.
☐ restrained ☐ defensive ☐ crazy ☐ super ☐ none of the above

13. The **labyrinth** was complex.
☐ refinery ☐ maze ☐ berth ☐ gallery ☐ none of the above

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READING COMPREHENSION

DIRECTIONS: Read each story. Then mark the answer that best completes the sentence or answers the question.

French porcelain, known for its beauty and durability, is a relatively recent French product.

The product began, as all products do, with a demand. About the time Columbus was setting forth on his voyages to the New World, lovely Chinese porcelain was being introduced in Europe. "China," as the porcelain was dubbed, became fashionable to own in spite of its price. For more than 200 years, the tables of Europe were graced almost exclusively with Chinese porcelain.

Of course, European craftsmen were eager to copy Oriental china. In fact, fine fragile porcelain was made in Italy and France. The problem was its frailty; the Europeans were not able to identify the substance that gave Oriental china its superior strength.

A court alchemist in Germany finally found the secret ingredient, a clay called kaolin, in 1705. German factories began production a few years later. The Germans tried to keep their secret, but a French surgeon discovered deposits of kaolin near the city of Limoges in 1765. Soon French production of fine china centered in Limoges.

Imagine what work in the old clay mills must have been like. The millstones were run by a waterwheel. Dust covered workers fed clay and minerals into the mill to produce a fine powder. They trod on the powder, mixing it with water, to create a gray paste. The paste was aged and ripened before being sent on to the artists who shaped and fired it. Limoges porcelain was, and still is, fired many times. Between these firings, artists carefully decorated this fine porcelain by hand, creating a beautiful, durable product.

26. Based on the passage, it became possible for the Germans to produce a durable porcelain ____________

☐ after Chinese porcelain had lost is popularity
☐ after they conferred with other European countries on porcelain production
☐ before Italian porcelain was ever produced
☐ before the French discovered kaolin

27. Limoges, France, became a center of porcelain production because ____

☐ an important element for porcelain production was found near the city
☐ there was a great demand for quality china in the city
☐ many porcelain artists lived in or around the city
☐ the waterways necessary for running the millstones were plentiful in that area of France

28. After kaolin and other minerals were mixed into a paste, the paste was ___

☐ mixed with water
☐ sent to artists
☐ aged and ripened
☐ shaped and fired

29. What is the main idea of this passage?

☐ Chinese porcelain was introduced in Europe in the late fifteenth century
☐ A great deal of money has been made in the production of porcelain.
☐ The first porcelain produced by European craftsmen was quite fragile.
☐ The demand for quality china in Europe ultimately resulted in the production of French porcelain.

30. The early porcelain from Italy and France differed from Oriental porcelain in that it was _______

☐ more in demand
☐ more fashionable
☐ less durable
☐ less fragile

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Our era has been called the "age of the wing." The application of the principles of flight to transportation has changed our world irrevocably. Even the pioneers of flight did not fully comprehend the effect their inventions and improvements would have on ordinary human beings. For example, Wilbur Wright once said that he thought the airplane would be limited to special uses, such as conducting warfare or carrying the mail. He, too, was unable to foresee the impact of flight on the world of transportation.

Most people either have been passengers on a commercial airplane or have known people who have traveled this way. Hundreds of flights arrive and depart from major cities every day. The airline industry seems to fill the skies with commercial aircraft.

That picture is an illusion. Actually, the most air time is logged by general aviation aircraft operated by private pilots. In 1980 more than 800,000 private pilots were licensed to fly in this country. These private pilots logged more than five times the air time of commercial pilots, and they flew almost double the number of miles.

Who are these general aviation pilots? These pilots include those who fly air taxis and those who fly for their own pleasure. Many own their own aircraft, others fly company planes, and still others share small planes.

In order to be certified by the Federal Aviation Administration, a pilot must complete two types of training. Each pilot must complete ground school and pass a written test. At the same time each pilot is required to take flight training that consists of at least forty hours of flight time, half of which must be solo flight. When both types of training are completed, the applicant is ready to take the FAA flight check. The certification requirements set by the Federal Aviation Administration are relatively strict, aiding in the protection of crew and passengers in this "age of the wing."

31. If Wilbur Wright had been correct, today's commercial airlines ______

- ☐ would be far more successful than general aviation aircraft
- ☐ would be fewer in number
- ☐ would be more strictly controlled by the Federal Aviation Administration
- ☐ would have been taken over by other businesses

32. According to the passage, the certification requirements set by the Federal Aviation Administration ___

- ☐ limit the number of general aviation pilots licensed each year
- ☐ protect the safety of aircraft passengers and crew
- ☐ require sixty hours of flight time, twenty of which are solo flight hours
- ☐ very depending upon the type of license under application

33. After an applicant for pilot certification has passed a written exam and completed forty hours of flight training, the applicant must ______

- ☐ pass an FAA flight check
- ☐ log twenty hours of solo flight time
- ☐ complete ground school training
- ☐ file an application with Federal Aviation Administration

34. What is the main idea of this passage?

- ☐ Pioneers of flight understood the implications of their inventions long before anyone else.
- ☐ Today the skies are filled with commercial aircraft.
- ☐ Hundreds of aircraft are being operated today by both commercial and private pilots.
- ☐ The Federal Aviation Administration sets the certification standards for general aviation pilots.

35. As a group, how do commercial pilots compare with general aviation pilots?

- ☐ Commerical pilots spend less time in the air.
- ☐ Commercial pilots fly a greater number of air miles.
- ☐ General aviation pilots work only for airline companies.
- ☐ Some general aviation pilots must meet strict FAA standards.

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The last half of this century has been a time of startling growth in scientific knowledge. Our power to shape our world has never been greater; sadly, our vision of the future seems restricted. Where are the grand plans, the large scale wonders? Don't worry, the macroengineers are working on them.

Although macroengineering, engineering on a large scale, is a new term, it's hardly a new idea. The Great Wall of China, the only hand built object visible from the moon, is an impressive and ancient example. Macroengineers view the earth as a rough copy and all things as possible. Only a few macroprojects are presently in the works, like the 33 mile tunnel recently completed in Japan. But there are plenty on the drawing boards. Let's consider two examples.

Robert Salter originated the idea for the planetran in 1961 as he was trying to design a 3,000 mph airplane. Air drag was his main problem. It occured to him that hurtling above the ground was not his only option. Why not construct a vacuum tube highway underground? Electromagnets would suspend the "train" mid-vacuum and propel it along at speeds in excess of 6,000 mph. The ride from New York to Los Angeles would take about 50 minutes. Salter estimates the cost at $500 billion. The technology is here; the money isn't.

Where others see barren desert, Canadian Thomas Kiernans envisions farmland. His scheme is to create another huge freshwater lake north of the Great Lakes by building a 100 mile long dike across the mouth of Canada's James Bay. The water would then be piped 165 miles to the Great Lakes which would serve as a reservoir for the continent. Next, canals would be drilled through the Rockies, and the Southwest would bloom. The estimated cost is $100 billion. Although , reportedly, Canadians are concerned about sharing their water, the technology exists to tackle this project.

As macro as these projects are, they have a value greater than themselves. Macroprojects, like landing on the moon, serve as source of national pride. They calm passions of patriots without resorting to warfare. As outlandish as macroprojects may seem, they are, in today's nuclear age, a saner direction in which to focus our creative energies.

41. Based on this passage, you can conclude that building an underground vacuum tube would be ________.
☐ an impossible engineering problem
☐ cheaper than a 3,000 mph plane
☐ one way of eliminating air drag
☐ more costly now than in the future

42. Some Canadians are against the water project because ________
☐ it would cost too much money
☐ it would harm the environment
☐ it would send their water to America
☐ they see it as an idea that won't work

43. In Thomas Kieran's plan, which event happens first?
☐ A dike is built to dam a bay.
☐ Canals are built to carry water west.
☐ Tunnels are drilled through the Rockies.
☐ Water is piped to the Great Lakes.

44. What is the main idea of the passage?
☐ Macroprojects are being designed.
☐ Money is too scarce to waste on macroprojects.
☐ Nuclear power is extremely dangerous.
☐ Scientific knowledge is growing rapidly.

45. Based on information presented in the passage, Kiernans' and Salter's projects are alike because ________
☐ their estimated costs are about the same
☐ they are unable to secure financial support
☐ they could be constructed in the future
☐ public opposition stands in their way

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For hundreds of years, the toxic properties of lead have been recognized. Yet, despite efforts to control and limit its use, lead poisoning continues to plague society. Even more distressing, though — lead poisoning is now posing a serious threat to the health and the lives of children.

Lead enters the body in essentially two ways: through the nose and through the mouth. It is then absorbed into the bloodstream through either the lungs or the intestines. Lead that is inhaled from the air seldom, if ever, reaches toxic levels. However, the lead that enters the digestive system can be life threatening.

The average person takes in a small amount of lead each day. After its absorption into the bloodstream, the kidneys eliminate lead through body waste. When the absorption of lead exceeds normal limits, however, the kidney's ability to remove it decreases. A buildup occurs, and the body begins to store the lead in the bones. There it interferes with the production of red blood cells and their ability to carry oxygen. Hence, the body's tissues are deprived of needed oxygen.

Two early symptoms that may surface months after the lead has entered the body are diarrhea and anemia. As the lead level rises, seizures and even death may result. Those who recover suffer from nervous disorders ranging from mild brain damage, which affects learning and behavior, to mental retardation.

The real tragedy of lead poisoning is that it victimizes innocent children between the the ages of one and five. Primarily, these are the children of low-income families living in the poorly maintained buildings of our impoverished inner cities. Old paint, applied prior to the elimination of lead in residential paint, is now peeling and flaking from the surfaces of these buildings. Young children have a normal curiosity about their surroundings. Some youngsters also have an odd craving for strange substances; this craving is known as pica. The combination of the two is blamed for most cases of lead poisoning. A thumbnail-sized flake of paint which, ironically, tastes sweet to children, can contain a dangerous amount of lead.

For many years government agencies have been taking steps to minimize the lead in our environment. Today screening programs are available that can help to identify and remove lead paint from inner-city buildings. Through the aid of such programs, we can now identify these children before they become victims.

36. Based on this passage, you can conclude that ________________.
- ☐ residential paint manufacture today contains no lead
- ☐ the concentration of lead in the air is lower than that found in paint manufactured today
- ☐ symptoms of lead poisoning are immediately apparent in the victim
- ☐ a lack of oxygen in the blood is a cause of lead poisoning

37. A buildup of lead in the body occurs because ___________.
- ☐ the kidneys are unable to remove all the lead
- ☐ the digestive system ceases to function
- ☐ the bones can no longer store the lead
- ☐ the body's tissues are deprived of oxygen

38. What happens first after lead enters the body?
- ☐ It interferes with blood circulation
- ☐ It is absorbed into the bloodstream
- ☐ It is removed by the kidneys.
- ☐ It is stored in the bones.

39. What is the main idea of the passage?
- ☐ Children should be taught about the dangers of lead poisoning at an early age.
- ☐ Lead poisoning causes nervous disorders that affect learning and behavior.
- ☐ Lead poisoning is a serious problem affecting the lives and futures of children.
- ☐ Paint peelings from old inner-city buildings have a dangerously high lead content.

40. Lead that is inhaled from the air is different from lead that is digested because ______________
- ☐ inhaled lead deprives the body of oxygen
- ☐ inhaled lead is not likely to cause poisoning
- ☐ only children are exposed to inhaled lead
- ☐ the kidneys are unable to remove inhaled lead

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PART II

STUDENT QUESTIONNAIRE

DIRECTIONS: Mark an X in the box that best answers the question, or write in your answer in the blank provided. NOTE: wherever "parents," "mother," or "father" is used, answer the questions for the ADULT(s), such as parents, stepparents, grandparents, relatives or guardians who were RESPONSIBLE for you at the time.

1. Please list all the schools that you have attended, starting from kindergarten. Give the name of the school, what grades you attended there, and the school's location. If the school was private or parochial, put an X in the box at the end of that line.

SCHOOL NAME	GRADES	CITY	STATE	(Private?)
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐

2. What is your ethnic background? Asian/Pacific ☐ Black ☐ Hispanic ☐ American Indian ☐ Any Other ☐

3. What is your sex? Female ☐ Male ☐

4. What is your birthdate? ____ /____ /19____
(Mo) (Day) (Yr)

5. How many people are in your immediate family including you?

2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 or more ☐

6. Which child are you? Youngest ☐ Middle ☐ Oldest ☐ Only Child ☐

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7. About how much education do your parents have?

	Some HS	High School Degree	2-years of College or Technical School	4-years of College	Graduate or professional school after college	Don't Know
Father	☐	☐	☐	☐	☐	☐
Mother	☐	☐	☐	☐	☐	☐

8. Is a language other than English spoken in your home? No ☐ Yes ☐

If YES, what is that language?____________________________

About how often is that language spoken at home? Hardly ever ☐ Most of the time ☐

Who speaks the language in your home? Parents ☐ Children ☐ All ☐

9. Which of the following things do YOU own? (Mark all that apply)

Your own TV set	Your own stereo	Your own car	Your own phone
☐	☐	☐	☐

10. Which of the following things are available in your home? (Mark all that apply)

Encyclopedia	Your own room	Dictionary	Public Library card
☐	☐	☐	☐

11. Which, if any, of the following experiences have you had since starting school? Mark each grade in which you had the experience in. Mark "None" if you never had the experience.

	GRADES												
EXPERIENCE	K	1	2	3	4	5	6	7	8	9	10	11	None
Held back a grade in school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended summer school for make-up	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended remedial reading classes at school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended remedial speech classes at school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended remedial English classes at school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended bilingual classes at school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Been suspended from school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended gifted or honors classes at school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Skipped a grade (double promoted)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Attended reading classes after school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Had a special tutor in reading after school	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

GO ON TO THE NEXT PAGE

12. **How often did your mother work when you were**

	Did not work	Part time	Full time	Can't remember
ages 3 to 5, before kindergarten?	☐	☐	☐	☐
ages 5 to 12, in grades K to 6?	☐	☐	☐	☐
ages 12 to 18, in grades 7 to 12?	☐	☐	☐	☐

13. **About how old were you when you first began to read?**

Age	3	4	5	6	7	8 or older	Can't remember
	☐	☐	☐	☐	☐	☐	☐

14. **Indicate if you AGREE or DISAGREE with each of the following statements about reading by marking an X in the appropriate box.**

	AGREE	DISAGREE
The only books I like to read are those I choose myself.	☐	☐
Sometimes I would rather read than talk with friends.	☐	☐
I do not like most school reading assignments.	☐	☐
I enjoy going to bookstores.	☐	☐
I usually put off doing reading homework as long as possible.	☐	☐
The best books are those with lots of pictures.	☐	☐
Sometimes I will stay up late to finish reading something I like.	☐	☐
Reading has always been difficult for me.	☐	☐
Sometimes I laugh out loud when I read something funny.	☐	☐
I have difficulty understanding school reading work.	☐	☐
I don't like reading assignments that are more than 5 pages long.	☐	☐
The library is a boring place.	☐	☐
When I have to wait, I often find something to read to pass the time.	☐	☐
I don't read much because I read slowly.	☐	☐
I usually finish reading assignments before other students in my classes.	☐	☐
Reading is one of my strongest skills.	☐	☐
Interesting reading makes time pass quickly.	☐	☐
When I try to read fast I don't understand what I've read.	☐	☐
I can usually find something interesting to read.	☐	☐
I enjoy telling my friends about things I've read.	☐	☐

GO ON TO THE NEXT PAGE

DIRECTIONS: The questions on this page are about your PRESCHOOL experiences before starting kindergarten (ages 3 to 5).

15. If your mother worked before you started kindergarten, who usually took care of you while she worked?

Adult Relative	Older Brother or sister	Baby-sitter	Neighbor	Daycare Center	Can't Remember
☐	☐	☐	☐	☐	☐

Where did they usually watch you while your mother was at work?

YOUR home	THEIR home	Daycare Center	Can't Remember
☐	☐	☐	☐

16. Did you go to any preschool educational programs before you started kindergarten? How long did you go? (Mark all that apply)

	Did not Attend	A Year or less	1 to 2 Years	More than 2 years	Don't Know
Head Start	☐	☐	☐	☐	☐
Half-day preschool program	☐	☐	☐	☐	☐
All-day preschool program	☐	☐	☐	☐	☐
Parent-child classes	☐	☐	☐	☐	☐
Special lessons like swimming, dance or music	☐	☐	☐	☐	☐
Sunday school	☐	☐	☐	☐	☐

17. How often did the following activities happen in your home before you started kindergarten?

	RARELY once or twice each year	SOMETIMES a few times each year	REGULARLY a lot of times each year	Can't Remember
Reading stories at bedtime	☐	☐	☐	☐
Learning nursery rhymes and stories	☐	☐	☐	☐
Watching Sesame Street on TV	☐	☐	☐	☐
Playing with crayons and coloring books	☐	☐	☐	☐
Reading books together	☐	☐	☐	☐
Playing word or number games	☐	☐	☐	☐

GO ON TO THE NEXT PAGE

DIRECTIONS: The questions on this page are about your ELEMENTARY SCHOOL experiences, grades K to 6 (about ages 5 to 12).

18. In grades 1-6, what was your usual grade in READING?

A	B	C	D
☐	☐	☐	☐

19. If your mother worked when you were in grades 1 to 6, who usually watched you when she was at work?

Mother didn't work	Adult Relative	Brother or sister	Baby-sitter	Neighbor	Daycare Center	Nobody	Can't Remember
☐	☐	☐	☐	☐	☐	☐	☐

20. About how many days of school did you miss in grades K-6?

I missed a lot	I missed a few days	I hardly missed any	Can't Remember
☐	☐	☐	☐

21. About how often did your parents do the following things when you were in elementary school, grades K to 6?

	once or twice each year RARELY	a few times each year SOMETIMES	a lot of times each year REGULARLY	Can't Remember
set regular times for meals	☐	☐	☐	☐
assigned chores for you to do	☐	☐	☐	☐
told you what TV shows you could or could not watch	☐	☐	☐	☐
set a regular time for you to do your homework	☐	☐	☐	☐
gave you rewards for good school work	☐	☐	☐	☐
attended PTA meetings and parent-teacher conferences	☐	☐	☐	☐
helped you with your homework	☐	☐	☐	☐
gave you books or magazines to read	☐	☐	☐	☐
read out loud to you at bedtime	☐	☐	☐	☐
took you to the library	☐	☐	☐	☐
talked with you about reading	☐	☐	☐	☐

22. About how often did you do the following things at home in grades K-6?

	once or twice each year RARELY	a few times each year SOMETIMES	a lot of times each year REGULARLY	Can't Remember
Write a paper or story	☐	☐	☐	☐
Work on a spelling lesson	☐	☐	☐	☐
Do a set of arithmetic problems	☐	☐	☐	☐
Read a book for school	☐	☐	☐	☐
Take a school book home	☐	☐	☐	☐
Put together a science project	☐	☐	☐	☐

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DIRECTIONS: The questions on the next 3 pages are about your experiences in JUNIOR AND SENIOR HIGH SCHOOL, in grades 7 to 11 (from about ages 12 to 17).

23. What is your usual high school grade in ENGLISH?

A	B	C	D
☐	☐	☐	☐

24. About how many days per month are you absent in high school?

less than 3 days	between 3 to 5	more than 5 days	don't know
☐	☐	☐	☐

25. What kind of high school program are you enrolled in?

College Preparatory	Business	General	Vocational Technical	Don't Know
☐	☐	☐	☐	☐

26. Indicate in which grades you took the following subjects, including this year.

Subject	Grade 9	10	11	12	don't know
English	☐	☐	☐	☐	☐
Mathematics	☐	☐	☐	☐	☐
Science	☐	☐	☐	☐	☐
Foreign Language	☐	☐	☐	☐	☐

27. How much education do you plan to finish?

High School Degree	2 Yr College Degree or Technical School	4 Yr College Degree	Graduate or Professional school	Don't Know
☐	☐	☐	☐	☐

28. What do you plan to be doing next fall? (Mark any that apply.)

Military Service	Work Full time	Attend school full time	Work part time	Attend school part time	Don't know
☐	☐	☐	☐	☐	☐

29. About how many books did you read in the past year that were NOT required for school?

Number of books __________

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30. For each activity listed below, tell how many hours PER DAY on weekdays (M-F) and on weekend days (S-Su) that you usually spend doing it. If you do NOT do an activity, mark "0" for that activity.

(Activity)		(Hours per day) 0	1	2	3	4	5	6
Organized school-sponsored activities like athletic teams, clubs, student government or school social events like dances and games	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
School work at home like writing a paper doing math problems and reading	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Private lessons like dance and music, including practice time	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
After school recreational activities like sports and organized groups like scouts, the Y and church groups	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Socializing with friends like dating, hanging out, riding around, talking on the phone, going to the movies, and shopping	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Hobbies like repairing cars and things, sewing, gardening, and collecting things	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Paid jobs like babysitting, paper routes, and working in restuarants or stores	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Chores at home like cooking and cleaning	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Watching TV	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐
Reading books, magazines, and newspapers for your own pleasure or information	M - F	☐	☐	☐	☐	☐	☐	☐
	S - Su	☐	☐	☐	☐	☐	☐	☐

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31. How often do your parents do the following things now that you are in high school?

	RARELY once or twice each year	SOMETIMES a few times each year	REGULARLY a lot of times each year	Can't Remember
Set regular times for you to be home by	☐	☐	☐	☐
Assign chores for you around the house	☐	☐	☐	☐
Say what TV shows you can and can't watch	☐	☐	☐	☐
Say what movies you can and can't see	☐	☐	☐	☐
Set a regular time for you to do homework	☐	☐	☐	☐
Gave rewards for good school work	☐	☐	☐	☐
Attend school events like plays and games	☐	☐	☐	☐
Help you with your homework	☐	☐	☐	☐
Give you books or magazines to read	☐	☐	☐	☐
Go with you to museums, plays or concerts	☐	☐	☐	☐
Go with you to any library	☐	☐	☐	☐
Talk with you about books they've read	☐	☐	☐	☐
Set regular times for meals	☐	☐	☐	☐
Go to PTA or parent-teacher meetings	☐	☐	☐	☐

32. How often are you assigned the following types of homework in high school?

	every day	1-3 times a week	twice a month	once a month	once a semester	never
Book reports	☐	☐	☐	☐	☐	☐
Writing papers for English	☐	☐	☐	☐	☐	☐
Looking up information in the library	☐	☐	☐	☐	☐	☐
Memorizing speeches, poems, and parts of a play	☐	☐	☐	☐	☐	☐
Math and/or science problems	☐	☐	☐	☐	☐	☐
Reading chapters from a textbook	☐	☐	☐	☐	☐	☐

GO ON TO THE NEXT PAGE

31. How often do your parents do the following things now that you are in high school?

	RARELY once or twice each year	SOMETIMES a few times each year	REGULARLY a lot of times each year	Can't Remember
Set regular times for you to be home by	☐	☐	☐	☐
Assign chores for you around the house	☐	☐	☐	☐
Say what TV shows you can and can't watch	☐	☐	☐	☐
Say what movies you can and can't see	☐	☐	☐	☐
Set a regular time for you to do homework	☐	☐	☐	☐
Gave rewards for good school work	☐	☐	☐	☐
Attend school events like plays and games	☐	☐	☐	☐
Help you with your homework	☐	☐	☐	☐
Give you books or magazines to read	☐	☐	☐	☐
Go with you to museums, plays or concerts	☐	☐	☐	☐
Go with you to any library	☐	☐	☐	☐
Talk with you about books they've read	☐	☐	☐	☐
Set regular times for meals	☐	☐	☐	☐
Go to PTA or parent-teacher meetings	☐	☐	☐	☐

32. How often are you assigned the following types of homework in high school?

	every day	1-3 times a week	twice a month	once a month	once a semester	never
Book reports	☐	☐	☐	☐	☐	☐
Writing papers for English	☐	☐	☐	☐	☐	☐
Looking up information in the library	☐	☐	☐	☐	☐	☐
Memorizing speeches, poems, and parts of a play	☐	☐	☐	☐	☐	☐
Math and/or science problems	☐	☐	☐	☐	☐	☐
Reading chapters from a textbook	☐	☐	☐	☐	☐	☐

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DIRECTIONS: The questions on this page are about your parents at this time.

33. How often do your parents read the following types of materials?

	ALWAYS just about every day	OCCASSIONALLY a couple of times a week	RARELY less often than weekly	DON'T KNOW
Newspapers	☐	☐	☐	☐
Magazines	☐	☐	☐	☐
Books	☐	☐	☐	☐

34. What is the LEAST amount of education that you think your parents want you to finish?

High School Degree	2 Yr College Degree or Technical School	4 Yr College Degree	More than 4 Yrs of College	Don't Know
☐	☐	☐	☐	☐

35. About how many BOOKS do you estimate that your parents have at home?

Number of books: ________

36. About how many NEWSPAPERS do your parents get at home?

none	one a week	two a week	one a day	two a day	several a day	Don't Know
☐	☐	☐	☐	☐	☐	☐

37. About how many MAGAZINES do your parents subscribe to?

none	1 or 2	3 or 4	more than 5	don't know
☐	☐	☐	☐	☐

38. What are your parent's occupations, in one or two words?

Father ____

Mother ____

STOP

Go back and make sure that you have answered all questions.

Appendix B

List of Study Participants

KFS Follow-up Elementary Schools and Number of Students With Follow-up Data

DIST. NO.	CITY, STATE	DISTRICT/SCH. CODE	ELEM. SCHOOL	NO. OF KFS STUDENTS	DIST. TOTAL
1	Concord, In.	0702			
		2158	OxBow	15	
		2161	South Side	15	71
		2162	East Side	21	
		2163	West Side	20	
2	Wyoming, Mi.	1153			
		2998	Southwest	5	
		2999	Parkview	11	
		3000	East	18	
		3001	West	18	
		3002	Taft	13	121
		3003	Southeast	17	
		3004	Gladiola	13	
		3005	Pinery Park	3	
		3006	Rogers Lane	13	
		3007	Clyde Park	10	
3	Akron, Oh.	1501			
		3211	Barrett	17	
		3215	Lawndale	1	
		3216	Lincoln	6	
		3217	Macbright	13	
		3218	Portage Path	16	
		3220	Schumacher	14	
		3222	Voris	1	
		3226	Case	1	
		3227	Crouse	24	
		3228	Erie Island	2	
		3230	Findley	16	203
		3231	Firestone Park	1	
		3232	Fraunfelter	1	
		3234	Hotchkiss	8	
		3237	Lane	8	
		3228	Leggett	2	
		3239	Magaret Park	22	
		3240	Mason	9	
		3243	Rankin	37	
		3245	Ritzman	1	
		3246	Seiberling	3	
		3247	Smith	1	
			Sub Total:	395	395

DIST. NO.	CITY, STATE	DISTRICT/SCH. CODE	ELEM. SCHOOL	NO. OF KFS STUDENTS	DIST. TOTAL
4	Kankakee, IL.	0612			
		2030	Edison	14	19
		2031	Longfellow	5	
5	Lakeshore, Mi.	1127			
		2836	Stewart	15	74
		2837	Stevensville	13	
		2838	Baroda	13	
		2839	Hollywood	12	
		2840	Roosevelt	21	
6	Lasalle-Peru, IL.	0613			
		2032	Jackson	11	40
		2033	Jefferson	15	
		2034	Matthiessen	13	
7	Lawrence, KA.	0801			
		2359	Kennedy	15	61
		2360	India	14	
		2361	Cordley	12	
		2362	Pinckney	12	
		2363	Riverside	8	
8	Logonsport, In.	0712			
		2282	Fairview Park	12	37
		2283	Columbia	11	
		2284	Longfellow	14	
9	Madawaska, Me.	1010			
		2517	St. Thomas	83	83
12	Ottawa Lake, Mi.	1150			
		2993	Whiteford Elem.	46	46
			Sub Total:	360	360

DIST. NO.	CITY, STATE	DISTRICT/SCH. CODE	ELEM. SCHOOL	NO. OF KFS STUDENTS	DIST. TOTAL
13	Savanna, IL	0625			
		2093	Chestnut Park	52	52
14	Spring Valley, IL.	1549			
		2131	Lincoln	13	
		2132	John F. Kennedy	20	33
15	Tahoe-Truckee, Ca.	0329			
		1482	Truckee Elem.	18	32
		1483	Tahoe Lake	9	
		1484	Kings Beach	5	
16	Weatherford, Ok.	1609			
		3617	Weatherford East	18	18
17	Windsor, Ct.	1409			
		1597	Roger Wolcott	10	
		1598	John F. Kennedy	14	
		1599	Clover St.	20	
		1600	Poquonock	21	116
		1601	Ellsworth	21	
		1602	John Fitch	23	
		1603	Deerfield	7	
19	Youngstown, Oh.	1561			
		3535	Mary Haddow	5	
		3536	Harding	9	
		3537	Harrison	9	34
		3540	Thorn Hill	3	
		3541	J. White	8	
			Sub Total:	285	285

DIST. NO.	CITY, STATE	DISTRICT/SCH. CODE	ELEM. SCHOOL	NO. OF KFS STUDENTS	DIST. TOTAL
20	Sacramento, Ca.	0324			
		1332	Jedediah Smith	1	
		1338	Camellia	1	
		1341	Warren	1	
		1343	Elder Creek	5	
		1344	Freeport	2	
		1346	Fruit Ridge	4	
		1353	Bonnheime	8	
		1354	Maple	2	
		1356	Oak Ridge	2	61
		1357	Erlewine	3	
		1358	Pacific	1	
		1359	Parkway	1	
		1360	Hearst	2	
		1361	Riverside	1	
		1362	Sequoia	7	
		1369	Crocker	5	
		1373	Cohen	8	
		1376	Sutterville	6	
		1377	Thomas Jefferson	1	
21	Orange County, Fl.	0507			
		1886	Audubon Park	1	
		1887	Hillcrest	2	
		1888	Orange Center	11	
		1889	Pinelock	2	
		1891	Union Park Elem.	15	
		1892	Lovel Elem.	10	
		1894	Phyliss Wheatley	23	107
		1896	Orlo Vista	4	
		1898	Riverside Elem.	13	
		1899	Kaley	2	
		1900	Fern Creek	4	
		1902	Brookshire	12	
		1903	Pine Hills	1	
		1904	Columbia Elem.	7	
22	Fremont, In.	0714			
		2293	Fremont	17	17
25	Huntington, In.	0708			
		2203	Lincoln	22	
		2205	Central	44	
		2206	Horace Mann	33	
		2207	Lancaster	31	220
		2208	Northwest	31	
		2210	Roanoke Elem.	24	
		2211	Salamoine	20	
		2212	Union	15	
			Sub Total:	405	405

DIST. NO.	CITY, STATE	DISTRICT/SCH. CODE	ELEM. SCHOOL	NO. OF KFS STUDENTS	DIST. TOTAL
26	Lancing, Ka	0807			
		2375	Sallie Zoll	26	26
27	Oregon-Davis, In.	0720			
		2316	Grover	5	
		2317	Davis	14	19
28	Los Angeles, Ca.	0382			
		1160	Loren Miller	3	44
		1161	66th	4	
		1166	Graham	5	
		1168	97th	4	
		1220	Pacoima	11	
		1268	111th	4	
		1273	Heliotrope	13	
			Sub Total:	89	89

TOTAL: 23 Districts   127 Elem. schools   1533 Students

Appendix C

Print Outs of the Descriptive Statistics and ANOVAS

D1 - Refers to the Design B factor

D2 - Refers to the Design C factor

TED - Refers to the effects variable of Parents Education

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:13     U.C. IRVINE VAX/VMS                     DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    RDGSCR      AIMS READING TEST RAW SCORE
   BROKEN DOWN BY     D1

- - - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - - -

        VALUE  LABEL                            SUM      [illegible]     SUM OF SQ     CASES

         1.00                            19429.0000   12.[illegible]  4.1387  26395.1200      1542
         2.00                            11054.0000   12.6621      4.085[illegible] 1[illegible]551.3150       873
         3.00                            20121.0000   [illegible]                          1530
                                         ------------------------------------------------------
   WITHIN GROUPS TOTAL                   50604.0000   12.8274      3.9974  62991.5585      3945

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
   *                A N A L Y S I S   O F   V A R I A N C E
   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                             SUM OF
   SOURCE                    SQUARES           D.F.       SQUARE            F       SIG.

   BETWEEN GROUPS            263.8848             2     131.9424       8.2569      .0003

   WITHIN GROUPS           62991.5585          3942      15.9796

                     ETA =     .0645    ETA SQUARED =     .0042

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:14    U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    VOCSCR       TOTAL RAW VOCABULARY SCORE
     BROKEN DOWN BY   D1

- - - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E

    VALUE   LABEL                             SUM       [illegible]            SUM OF SQ       CASES

     1.00                              26338.0000     17.0033        3.9225 23816.9839        1549
     2.00                              14324.0000     16.9224        3.6935 11936.7215         876
     3.00                              26702.0000     [illegible]    [illegible] [illegible] [illegible]
                                       ---------------------------------------------------------
WITHIN GROUPS TOTAL                    67864.0000     17.1460        3.7183 54680.6812        3958


   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

   *                  A N A L Y S I S   O F   [illegible]

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                SUM OF                        [illegible]
SOURCE                          SQUARES        D.F.          SQUARE          F         SIG.

BETWEEN GROUPS                 188.9115           2         94.4558      6.8319      .0011
WITHIN GROUPS                54680.6812        3955         13.8257
                          ETA =    .0587     ETA SQUARED =   .0034

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10-JUL-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:43:58     U.C. IRVINE VAX/VMS                     DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   STAGE       CHALL READING STAGE
   BROKEN DOWN BY    D1

- - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - - - -

    VALUE  LABEL                         SUM         MEAN     STD DEV  SUM OF SQ     CASES

     1.00                          4163.0000       2.7015      1.0490  1694.6866      1541
     2.00                          2345.0000       2.6861      1.0503   962.0023       873
     3.00                          4281.0000       2.7999       .9764  1456.7600      1529
                                   ------------------------------------------------------
WITHIN GROUPS TOTAL               10789.0000       2.7362      1.0218  4113.4488      3943


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*               A N A L Y S I S   O F   V A R I A N C E                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                             SUM OF                       MEAN
SOURCE                      SQUARES        D.F.          SQUARE          F         SIG.

BETWEEN GROUPS              10.2423          2           5.1211       4.9052      .0075

WITHIN GROUPS             4113.4488        3940           1.0440

                     ETA =    .0498     ETA SQUARED =    .0025

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10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:43:59    U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   PSTAGE      PERCENT IN LOW CHALL CATEGORY
   BROKEN DOWN BY    D1

- - - - - - - - - - - - - - - - - - - - - - -  A N A L Y S I S   O F   V A R I A N C E  - - - - - -

     VALUE  LABEL                         SUM        MEAN    STD DEV  SUM OF SQ     CASES

      1.00                           258.0000       .1674      .3735   214.8047      1541
      2.00                           155.0000       .1775      .3824   127.4800       873
      3.00                           174.0000       .1138      .3177   154.1988      1529
                                    ---------------------------------------------------------
WITHIN GROUPS TOTAL                  587.0000       .1689      .3550   496.4834      3943


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                A N A L Y S I S   O F   V A R I A N C E                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                            SUM OF                    MEAN
SOURCE                     SQUARES        D.F.       SQUARE           F        SIG.

BETWEEN GROUPS              3.1290           2       1.5645     12.4157       .0000

WITHIN GROUPS             496.4834        3940        .1260

                  ETA =    .0791    ETA SQUARED =    .0063

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  27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
  10:10:22     U.C. IRVINE VAX/VMS                DEC VAX-11/780 VMS V4.5

  CRITERION VARIABLE    ATT
     BROKEN DOWN BY     D1

  - - - - - - - - - - - - - - - - - - - - - -  A N [illegible] O F  V A R I A N C E

     VALUE  LABEL                           SUM [illegible]          OF SQ   CASES

      1.00                            6207.0000   4.3074    1.2613  2290.8105    1441
      2.00                            3680.0000   4.3294    1.2433  1311.7647     350
      3.00                            6540.0000   4.[illegible]   [illegible]  2626.2341    1495
                                    ----------------------------------------------------
  WITHIN GROUPS TOTAL                16427.0000   4.3389    1.2624  6028.8094    3786


  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

  *             A N A L Y S I S   O F   V A [illegible]

  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                 SUM OF
  SOURCE                         SQUARES        D.F.      SQUARE          F         SIG.

  BETWEEN GROUPS                  3.4075          2       1.7037       1.0691      .3435

  WITHIN GROUPS                6028.8094       3783       1.5937

                        ETA =    .0238    ETA SQUARED =   .0006

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:17     U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   NBOOKS      BOOKS READ ON OWN IN LAST YEAR
   BROKEN DOWN BY    D1

- - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - - -

     VALUE  LABEL                        SUM    [illegible]   STD DEV  SUM OF SQ    CASES

      1.00                         3734.0000       2.4106     1.1180  1934.8664     1549
      2.00                         2124.0000       2.4247     1.0975  1054.0274      876
      3.00                         3651.0000  [illegible] [illegible] 1825.4296     1534
                             ---------------------------------------------------------
WITHIN GROUPS TOTAL                9509.0000  [illegible]     1.1032  4814.3234     3959

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

*                A N A L Y S I S   O F   V A [illegible]

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                SUM OF                      MEAN
SOURCE                          SQUARES       D.F.         SQUARE         F        SIG.

BETWEEN GROUPS                   1.3028          2          .6514      .5353     .5856

WITHIN GROUPS                 4814.3234       3956         1.2170

                          ETA =   .0164     ETA SQUARED =   .0003

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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:15    U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    READING      TIME SPENT FREE READING
   BROKEN DOWN BY     D1

- - - - - - - - - - - - - - - - - - - - - -  A N A L Y S I S   O F   V A R I A N C E

        VALUE  LABEL                     SUM   [illegible]              SUM OF SQ    CASES

         1.00                       2352.0000     1.5184      1.1616  2088.7256     1549
         2.00                       1440.0000     1.6438      1.1627  1182.8767      876
         3.00                       2445.0000  [illegible]    1.0884  1815.9824     1534
                                   -----------------------------------------------------
    WITHIN GROUPS TOTAL             6237.0000     1.5754      1.1340  5087.5847     3959


    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    *                ANALYSIS   OF   VAR[illegible]
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                 SUM OF                   [illegible]
    SOURCE                       SQUARES         D.F.       SQUARE          F        SIG.

    BETWEEN GROUPS                9.6590            2       4.8295     3.7553      .0236
    WITHIN GROUPS              5087.5847         3956       1.2860
                        ETA =     .0435    ETA SQUARED =     .0019
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:18     U.C. IRVINE VAX/VMS                       DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    REMED        REMEDIAL EDUCATION EXPERIENCE
    BROKEN DOWN BY    D1

- - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - -

        VALUE  LABEL                          SUM        MEAN      STD DEV   SUM OF SQ     CASES

         1.00                             820.0000      .5503      1.6342   3976.7248      1490
         2.00                             238.0000      .2803       .6136    319.2815       849
         3.00                             338.0000      .2270       .6482    625.2747      1489
                                      ----------------------------------------------------------
    WITHIN GROUPS TOTAL                  1396.0000      .3647      1.1343   4921.2810      3828


    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

    *               A N A L Y S I S   O F   V A R I A N C E

    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                  SUM OF                      MEAN
    SOURCE                       SQUARES          D.F.       SQUARE           F        SIG.

    BETWEEN GROUPS               85.6239            2       42.8119     33.2750      .0000

    WITHIN GROUPS              4921.2810         3825        1.2866

                          ETA =   .1308     ETA SQUARED =   .0171

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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:21    U.C. IRVINE VAX/VMS                     DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   ACH
   BROKEN DOWN BY    D1

- - - - - - - - - - - - - - - - - - - - - - -  A N A L Y S I S   O F   V A R I A N C E  - - - - - -

     VALUE  LABEL                              SUM        MEAN     STD DEV   SUM OF SQ     CASES

      1.00                               5881.0000      5.1633     1.6557   3119.6260      1139
      2.00                               3470.0000      5.1368     1.5734   1653.6442       669
      3.00                               6605.0000      5.3656     1.5905   3111.4996      1231
                                      ------------------------------------------------------------
WITHIN GROUPS TOTAL                     15956.0000      5.2504     1.6115   7884.7698      3039


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*                A N A L Y S I S   O F   V A R I A N C E                      *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                  SUM OF                     MEAN
SOURCE                           SQUARES        D.F.        SQUARE          F        SIG.

BETWEEN GROUPS                   27.6672          2        13.8336      5.3266      .0049

WITHIN GROUPS                  7884.7698       3036         2.5971
                          ETA =   .0591      ETA SQUARED =   .0035
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:15     U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    HSTRAK      HS CURRICULUM TRACK
     BROKEN DOWN BY   D1

- - - - - - - - - - - - - - - - - - - - - - - A N [illegible] V A R I A N C E

     VALUE   LABEL                     SUM    [illegible]

      1.00                       2242.0000    2.2578    .6206   382.0020    993
      2.00                       1399.0000    2.2456    .6047   227.4254    623
      3.00                       2660.0000    [illegible]
                                 ---------------------------------------------
WITHIN GROUPS TOTAL              6301.0000    2.2690    .6025  1007.0260   2777

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                A N A L Y S I S   O F   V A [illegible]

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                             SUM OF
SOURCE                       SQUARES       D.F.      SQUARE         F       SIG.

BETWEEN GROUPS                1.0345        2          .5172    1.4248    .2408

WITHIN GROUPS              1007.0260      2774         .3630

                      ETA =   .0320    ETA SQUARED =   .0010
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-86    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:22     U.C. IRVINE VAX/VMS                   DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   SES          FAMILY SOCIOECONOMIC STATUS INDEX
   BROKEN DOWN BY    D1

- - - - - - - - - - - - - - - - - - - - - - - -  A N A[illegible] O F   V A R I A N C E   - - - -

      VALUE   LABEL                        SUM    [illegible]            SUM OF SQ     CASES

       1.00                           4252.0000    2.8633     1.0694    1697.2498      1485
       2.00                           2474.0000    2.8307     1.0603     980.9382       874
       3.00                           4201.0000    [illegible]          1650.2780      1525
                                     -------------------------------------------------------
   WITHIN GROUPS TOTAL               10927.0000    2.8133     1.0561    4328.4661      3884


   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

   *                 A N A L Y S I S   O F   V A [illegible]

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                               SUM OF                    [illegible]
   SOURCE                     SQUARES        D.F.         SQUARE          F       SIG.

   BETWEEN GROUPS              9.2031           2         4.6015     4.1258     .0163

   WITHIN GROUPS            4328.4661        3881         1.1153

                         ETA =  .0461     ETA SQUARED =  .0021

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10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:43:59    U.C. IRVINE VAX/VMS              DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   TED
    BROKEN DOWN BY   D1

- - - - - - - - - - - - - - - - - - - - - -  A N A L Y S I S   O F   V A R I A N C E   - - - - - -

     VALUE  LABEL                       SUM       MEAN    STD DEV  SUM OF SQ    CASES

      1.00                        8786.0000     6.0385     2.6796 10439.8447     1455
      2.00                        5111.0000     5.9778     2.5416  5516.5778      855
      3.00                        8367.0000     5.6230     2.4034  8589.4940     1488
                                 ---------------------------------------------------
WITHIN GROUPS TOTAL              22264.0000     5.8620     2.5432 24545.9164     3798


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

*                   A N A L Y S I S   O F   V A R I A N C E                    *

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                            SUM OF                  MEAN
SOURCE                     SQUARES       D.F.      SQUARE        F         SIG.

BETWEEN GROUPS            141.7887          2     70.8944    10.9608      .0000

WITHIN GROUPS           24545.9164       3795      6.4680

                      ETA =  .0758    ETA SQUARED =  .0057

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:13     U.C. IRVINE VAX/VMS                     DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   READSCR      AIMS READING TEST RAW SCORE
   BROKEN DOWN BY    D2

- - - - - - - - - - - - - - - - - - - - - -   A N [illegible] O F   V A R I A N C E   - - - - - -

    VALUE   LABEL                            SUM  [illegible]                        CASES

     1.00                            30483.0000    12.6224      4.1188  40951.5925    2415
     2.00                             5637.0000    12.7823      3.9003   6695.1020     441
     3.00                            14484.0000    [illegible]           15262.8098    1089
                                     ---------------------------------------------------------
WITHIN GROUPS TOTAL                  50604.0000    12.8274      3.9948  62909.5045    3945


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

*                       A N A L Y S I S   O F  [illegible]

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                SUM OF
SOURCE                          SQUARES         D.F.        SQUARE          F       SIG.

BETWEEN GROUPS                  345.9388          2        172.9694    10.8385     .0000

WITHIN GROUPS                 62909.5045       3942         15.9588

                            ETA =   .0740    ETA SQUARED =   .0055

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:14     U.C. IRVINE VAX/VMS                         DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    VOCSCR      TOTAL RAW VOCABULARY SCORE
   BROKEN DOWN BY     D2

- - - - - - - - - - - - - - - - - - - - - -  A N [illegible]  V A R I A N C E

      VALUE  LABEL                         SUM

       1.00                           41162.0000    16.9740   [illegible]  35757.3633   2425
       2.00                            7559.0000    17.1018      3.6541   5888.4186    442
       3.00                           19143.0000   [illegible]
                                     ------------------------------------------------------
WITHIN GROUPS TOTAL                   67864.0000    17.[illegible]  [illegible]  54622.1943   3958

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                  A N A L Y S I S   O F   V[illegible]
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                 SUM OF
SOURCE                           SQUARES        D.F.      SQUARE         F          SIG.

BETWEEN GROUPS                  247.1984           2    123.5992     8.9566        .0001

WITHIN GROUPS                 54622.1943        3955     13.8109

                      ETA =    .0671     ETA SQUARED =     .0045
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:43:58    U.C. IRVINE VAX/VMS                 DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   STAGE      CHALL READING STAGE
    BROKEN DOWN BY   D2

- - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - - - -

     VALUE  LABEL                       SUM        MEAN     STD DEV  SUM OF SQ     CASES

      1.00                        6508.0000      2.6959      1.0493  2656.8202      2414
      2.00                        1187.0000      2.6916      1.0046   444.0590       441
      3.00                        3094.0000      2.8438       .9618  1005.4375      1088
                                 ---------------------------------------------------------
WITHIN GROUPS TOTAL              10789.0000      2.7362      1.0209  4106.3167      3943


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*              A N A L Y S I S   O F   V A R I A N C E                         *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                              SUM OF                 MEAN
SOURCE                        SQUARES       D.F.     SQUARE         F        SIG.

BETWEEN GROUPS                17.3744         2      8.6872    8.3354       .0002

WITHIN GROUPS               4106.3167      3940      1.0422

                      ETA =   .0649    ETA SQUARED =  .0042

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10-JUL-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:43:59     U.C. IRVINE VAX/VMS                 DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   PSTAGE     PERCENT IN LOW CHALL CATEGORY
   BROKEN DOWN BY    D2

- - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - - - -

    VALUE  LABEL                        SUM        MEAN      STD DEV   SUM OF SQ    CASES

     1.00                          413.0000       .1711       .3767    342.3418     2414
     2.00                           62.0000       .1406       .3480     53.2834      441
     3.00                          112.0000       .1029       .3040    100.4706     1088
                                 ----------------------------------------------------------
WITHIN GROUPS TOTAL                587.0000       .1489       .3548    496.0958     3943


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*             A N A L Y S I S   O F   V A R I A N C E                             *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                              SUM OF                      MEAN
SOURCE                        SQUARES        D.F.        SQUARE          F         SIG.

BETWEEN GROUPS                 3.5167           2        1.7583     13.9648      .0000

WITHIN GROUPS                496.0958        3940         .1259

                         ETA =  .0839    ETA SQUARED =   .0070

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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:22    U.C. IRVINE VAX/VMS                       DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    ATT
     BROKEN DOWN BY   D2

- - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - -

      VALUE  LABEL                      SUM      [illegible]   [illegible]   SUM OF SQ   CASES

       1.00                        9887.0000      4.3156      1.2543   3602.8337    2291
       2.00                        1886.0000      4.3860      1.2735    695.9163     430
       3.00                        4654.0000  [illegible] [illegible]  1730.2385    1063
                                 ---------------------------------------------------------
   WITHIN GROUPS TOTAL            16427.0000      4.3389      1.2624   6028.9885    3786


   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
   *                A N A L Y S I S   O F   V A R [illegible]
   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                SUM OF                    [illegible]
   SOURCE                      SQUARES        D.F.        SQUARE          F        SIG.

   BETWEEN GROUPS               3.2284          2         1.6142       1.0129     .3634

   WITHIN GROUPS             6028.9885       3783         1.5937

                         ETA =   .0231    ETA SQUARED =   .0005
   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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2 2

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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:17    U.C. IRVINE VAX/VMS                        DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   NBOOKS      BOOKS READ ON OWN IN LAST YEAR
   BROKEN DOWN BY    ID2

- - - - - - - - - - - - - - - - - - - - - -   A N [illegible] V A R I A N C E

     VALUE  LABEL                         SUM

       1.00                          5858.0000     2.4137     1.[illegible]  2989.0045      2425
       2.00                          1371.0000     2.4176     1.0905   525.7427       443
       3.00                          2580.0000     [illegible]
                                    --------------------------------------------------------
WITHIN GROUPS TOTAL                  9509.0000     2.4019     1.1031  4813.5556      3959


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                     A N A L Y S I S   O [illegible]

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                              SUM OF
SOURCE                       SQUARES        D.F.       SQUARE           F        SIG.

BETWEEN GROUPS                2.0705           2       1.0353       .8508      .4272

WITHIN GROUPS              4813.5556        3956       1.2168

                       ETA =   .0207     ETA SQUARED =   .0004

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:16    U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   READING      TIME SPENT FREE READING
   BROKEN DOWN BY    D2

- - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - -

      VALUE  LABEL                        SUM       MEAN     STD DEV   SUM OF SQ     CASES

       1.00                          3792.0000    1.5637    1.1633   3280.4066      2425
       2.00                           730.0000    1.6479    1.1255    611.0655       443
       3.00                          1715.0000  [illegible] [illegible] 1203.1017    1091
                                   ----------------------------------------------------------
  WITHIN GROUPS TOTAL                6237.0000    1.5754    1.1348   5094.5738      3959


  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
  *             A N A L Y S I S   O F   V A R I A N C E
  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                               SUM OF                     MEAN
  SOURCE                      SQUARES        D.F.        SQUARE          F        SIG.

  BETWEEN GROUPS               2.6699          2         1.3350       1.0366     .3548

  WITHIN GROUPS             5094.5733       3956         1.2878

                        ETA =  .0229    ETA SQUARED =   .0005

  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:19    J.C. IRVINE VAX/VMS                   DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    REMED       REMEDIAL EDUCATION EXPERIENCE
   BROKEN DOWN BY     D2

- - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - -

      VALUE  LABEL                            SUM       MEAN    STD DEV   SUM OF SQ    CASES

       1.00                              1058.0000     .4523     1.3617   4335.4348     2339
       2.00                               111.0000     .2587      .7271    226.2797      429
       3.00                               227.0000  [illegible]  [illegible]  [illegible]  [illegible]
                                        -----------------------------------------------------
WITHIN GROUPS TOTAL                      1396.0000     .3647     1.1385   4960.1023     3828


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

*                        A N A L Y S I S   O F   V A [illegible]

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                SUM OF                       [illegible]
SOURCE                          SQUARES         D.F.          SQUARE          F        SIG.

BETWEEN GROUPS                   46.8027           2         23.4013     18.0460     .0000

WITHIN GROUPS                  4960.1023        3825          1.2968

                           ETA =   .0967    ETA SQUARED =     .0093

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:21     U.C. IRVINE VAX/VMS                   DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    ACH
   BROKEN DOWN BY     D2

- - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - - - -

     VALUE   LABEL                          SUM    [illegible]    STD DEV   SUM OF SQ    CASES

      1.00                            9351.0000      5.1720     1.6253   4773.5039     1808
      2.00                            1903.0000      5.3155     1.5623    871.3324      358
      3.00                            4702.0000    [illegible]  [illegible]  2238.9095    873
                                     --------------------------------------------------------
    WITHIN GROUPS TOTAL              15956.0000      5.2506     1.6116   7883.7458     3039

    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    *                A N A L Y S I S   O F   V A [illegible]
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                 SUM OF                   [illegible]
    SOURCE                       SQUARES        D.F.       SQUARE          F        SIG.

    BETWEEN GROUPS               28.6912          2       14.3456      5.5244     .0040

    WITHIN GROUPS              7883.7458       3036        2.5968

                           ETA =   .0602    ETA SQUARED =   .0036
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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BEST COPY AVAILABLE

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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:15    U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE   HSTRAK      HS CURRICULUM TRACK
   BROKEN DOWN BY    D2

- - - - - - - - - - - - - - - - - - - - - -   A N A L Y S I S   O F   V A R I A N C E   - - -

     VALUE  LABEL                          SUM        MEAN    STD DEV    SUM OF SQ     CASES

      1.00                           3641.0000      2.2531      .6143    609.4845      1616
      2.00                            757.0000      2.3292      .5714    105.7723       325
      3.00                           1903.0000      2.[illegible]   .[illegible]   2[illegible]1711       836
                                   -------------------------------------------------------
   WITHIN GROUPS TOTAL               6301.0000      2.2690      .6023   1006.4279      2777

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

   *                A N A L Y S I S   O F   V A R I A N C E

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                            SUM OF                    MEAN
   SOURCE                   SQUARES         D.F.      SQUARE          F        SIG.

   BETWEEN GROUPS            1.6326           2        .8163       2.2500     .1057

   WITHIN GROUPS          1006.4279        2774        .3628

                     ETA =   .0402     ETA SQUARED =   .0016

   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
10:10:22     U.C. IRVINE VAX/VMS                          DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    SES           FAMILY SOCIOECONOMIC STATUS INDEX
   BROKEN DOWN BY     D2

- - - - - - - - - - - - - - - - - - - - - - A N A L Y S I S   O F   V A R I A N C E

   VALUE  LABEL                              SUM        [illegible]     [illegible]  SUM OF SQ   [illegible]

    1.00                               6726.0000     2.8512     1.0659   2678.7741    2359
    2.00                               1196.0000     2.7182     1.0001    439.0545     440
    3.00                               3005.0000    [illegible]            1210.3963  [illegible]
                                  ----------------------------------------------------------------
WITHIN GROUPS TOTAL                   10927.0000     2.8133     1.0560   4328.2249    3884


 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 *                    A N A L Y S I S   O F   V A R

 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                                     SUM OF
 SOURCE                              SQUARES        D.F.        SQUARE          F          SIG.

 BETWEEN GROUPS                       9.4442          2          4.7221      4.2342      .0146

 WITHIN GROUPS                     4328.2249       3881          1.1152

                          ETA =   .0467      ETA SQUARED =   .0022

 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:43:59    U.C. IRVINE VAX/VMS                   DEC VAX-11/780 VMS V4.5

CRITERION VARIABLE    TED
    BROKEN DOWN BY    D2

- - - - - - - - - - - - - - - - - - - - - - -  A N A L Y S I S   O F   V A R I A N C E  - - - - - -

     VALUE  LABEL                          SUM         MEAN     STD DEV  SUM OF SQ     CASES

      1.00                          13897.0000       6.0160      2.6290 15958.4074      2310
      2.00                           2465.0000       5.7193      2.4951  2677.0302       431
      3.00                           5902.0000       5.5837      2.3651  5906.8401      1057
                                    ----------------------------------------------------------
WITHIN GROUPS TOTAL                 22264.0000       5.8620      2.5430 24542.2776      3798


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*              A N A L Y S I S   O F   V A R I A N C E                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

                              SUM OF                   MEAN
SOURCE                       SQUARES       D.F.       SQUARE          F        SIG.

BETWEEN GROUPS              145.4275          2      72.7137    11.2438      .0000

WITHIN GROUPS             24542.2776       3795       6.4670

                       ETA =  .0768    ETA SQUARED =  .0059

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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27-JUN-83    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:45:27     [illegible]                          DEC VAX-11/780 VMS V4.5

        * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

              RDGSCR    NIAC READING TEST RAW SCORE
        BY     1
              HSID      HIGH SCHOOL ID

                                             SUM OF                 MEAN               SIGNIF
SOURCE OF VARIATION                          SQUARES      DF        SQUARE       F     OF F

MAIN EFFECTS                                5163.762      44       117.358     8.214  0.000
   HSID                                     4982.408      42       118.629     8.267  0.000

EXPLAINED                                   5163.762      44       117.363     8.214  0.000

RESIDUAL                                   52289.938    3644        14.350

TOTAL                                      57453.701    3688        15.585

      [illegible]
```

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:45:10     U.C. IRVINE VAX/VMS                 DEC VAX-11/780 VMS V4.5

            * * *  A N A L Y S I S   O F [illegible]

               VOCSCR    TOTAL RAW VOCABULARY SCORE
          BY   D1
               HSID      HIGH SCHOOL ID

                                                SUM OF                MEAN              SIGNIF
SOURCE OF VARIATION                            SQUARES      DF      SQUARE        F     OF F

MAIN EFFECTS                                  5825.521      44     132.398   11.093   0.000
   D1                                          219.377       2     109.689    9.190   0.000
   HSID                                       5660.322 [illegible]  [illegible] 11.292  0.000

EXPLAINED                                     5825.521      44     132.398   11.093   0.000

RESIDUAL                                     43492.154    3644 [illegible]

TOTAL                                        49317.675    3688      13.372

    3959 CASES WERE PROCESSED.
     270 CASES (   6.8 PCT) WERE MISSING.
```

```
10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:45:30    U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

             * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                    STAGE     CHALL READING STAGE
             BY     D1
                    HSID      HIGH SCHOOL ID

                                              SUM OF                     MEAN               SIGNIF
SOURCE OF VARIATION                          SQUARES      DF            SQUARE        F       OF F

MAIN EFFECTS                                 410.477      44             9.329     9.871    0.000
   D1                                         11.218       2             5.609     5.935    0.003
   HSID                                      399.293      42             9.507    10.060    0.000

EXPLAINED                                    410.477      44             9.329     9.871    0.000

RESIDUAL                                    3464.597    3666             0.945

TOTAL                                       3875.074    3710             1.044

   3959 CASES WERE PROCESSED.
    248 CASES (  6.3 PCT) WERE MISSING.
```

```
10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:45:33    U.C. IRVINE VAX/VMS              DEC VAX-11/780 VMS V4.5

                  * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                    PSTAGE    PERCENT IN LOW CHALL CATEGORY
            BY      D1
                    HSID      HIGH SCHOOL ID

                                           SUM OF                       MEAN                 SIGNIF
SOURCE OF VARIATION                        SQUARES       DF            SQUARE          F       OF F

MAIN EFFECTS                                41.505        44            0.943       8.305    0.000
   D1                                        3.084         2            1.542      13.577    0.000
   HSID                                     38.234        42            0.910       8.015    0.000

EXPLAINED                                   41.505        44            0.943       8.305    0.000

RESIDUAL                                   416.366      3666            0.114

TOTAL                                      457.871      3710            0.123

   3959 CASES WERE PROCESSED.
    248 CASES (   6.3 PCT) WERE MISSING.
```

```
27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:46:05     U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

                 * * *  A N A L Y S I S   OF [illegible]

                  ATT
          BY      D1
                  HSID       HIGH SCHOOL ID

                                        SUM OF                  MEAN                 SIGNIF
SOURCE OF VARIATION                    SQUARES    D[illegible]  SQUARE[illegible]    OF [illegible]

MAIN EFFECTS                           104.954      44          2.385      1.600     0.008
   D1                                    1.644       2          0.822      0.551     0.576
   HSID                                104.109      42     [illegible]     1.662     0.005

EXPLAINED                              104.954      44          2.385      1.600     0.008

RESIDUAL                              4040.757    2710          1.491

TOTAL                                 4145.711    2754          1.505

     3959 CASES WERE PROCESSED.
     1204 CASES ( 30.4 PCT) WERE MISSING.
```

```
27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:46:10     U.C. IRVINE VAX/VMS                         DEC VAX-11/780 VMS V4.5

                 * * *  A N A L Y S I S   O F  [illegible]

                    NBOOKS    BOOKS READ ON OWN IN LAST YEAR
               BY   D1
                    HSID      HIGH SCHOOL ID

                                                   SUM OF                  MEAN                  SIGNIF
SOURCE OF VARIATION                               SQUARES       DF        SQUARE          F       OF F

   MAIN EFFECTS                                    58.380       44         1.327       1.216     0.157
      D1                                            3.863        2         1.931       1.769     0.171
      HSID                                         53.079       42     [illegible]     1.158     0.226

   EXPLAINED                                       58.380       44         1.327       1.216     0.157

   RESIDUAL                                      2958.152     2710         1.092

   TOTAL                                         3016.532     2754         1.095

      3959 CASES WERE PROCESSED.
      1204 CASES ( 30.4 PCT) WERE MISSING.
```

```
27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:46:07     U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

              * * *  A N A L Y S I S   O [illegible]

                    READING   TIME SPENT FREE READING
              BY    D1
                    HSID      HIGH SCHOOL ID

                                             SUM OF                      MEAN                  SIGNIF
    SOURCE OF VARIATION                     SQUARES   [illegible]       [illegible]       F    [illegible]

    MAIN EFFECTS                             88.255     44              2.006        1.893   0.000
      D1                                      5.485      2              2.742        2.588   0.075
      HSID                                   82.363     42          [illegible]      1.851   0.001

    EXPLAINED                                88.255     44              2.006        1.893   0.000

    RESIDUAL                               2871.431   2710          [illegible]

    TOTAL                                  2959.686   2754              1.075

       3959 CASES WERE PROCESSED.
       1204 CASES ( 30.4 PCT) WERE MISSING.
```

BEST COPY AVAILABLE

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 27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
 17:47:05     U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

                  * * * A N A L Y S I S   O [illegible]

                      REMED     REMEDIAL EDUCATION EXPERIENCE
                BY    D1
                      HSID      HIGH SCHOOL ID

                                           SUM OF                   MEAN                SIGNIF
 SOURCE OF VARIATION                       SQUARES    [illegible]   SQUARE      [illegible]    OF F

   MAIN EFFECTS                              9.859      44          0.224       1.706   0.003
      D1                                     0.793       2          0.396       3.017   0.049
      HSID                                   9.005      42     [illegible]      1.632   0.006

   EXPLAINED                                 9.859      44          0.224       1.706   0.003

   RESIDUAL                                349.572    2661     [illegible]

   TOTAL                                   359.431    2705          0.133

      3959 CASES WERE PROCESSED.
      1253 CASES ( 31.6 PCT) WERE MISSING.
```

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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:46:13     U.C. IRVINE VAX/VMS                      DEC VAX-11/780 VMS V4.5

              * * *  A N A L Y S I S   O F  V[illegible]

                  ACH
          BY      D1
                  HSID      HIGH SCHOOL ID

                                         SUM OF                 MEAN                SIGNIF
SOURCE OF VARIATION                     SQUARES     D[illegible]      SQUARE         F      OF [illegible]

MAIN EFFECTS                            279.471      44        6.352     2.571   0.000
   D1                                    15.525       2        7.763     3.142   0.043
   HSID                                 254.632      42     [illegible]  2.454   0.000

EXPLAINED                               279.471      44        6.352     2.571   0.000

RESIDUAL                               6696.299    271[illegible]  2[illegible]

TOTAL                                  6975.770    2754        2.533

      3959 CASES WERE PROCESSED.
      1204 CASES ( 30.4 PCT) WERE MISSING.
```

```
27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:47:10     U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

                * * *  A N A L Y S I S   O[illegible]

                   HSTRAK    HS CURRICULUM TRACK
            BY     D1
                   HSID      HIGH SCHOOL ID

                                            SUM OF                 MEAN                SIGNIF
SOURCE OF VARIATION                        SQUARES[illegible]                 F     [illegible]

MAIN EFFECTS                                80.808    44          1.837       5.418    0.000
   D1                                        4.415     2          2.208       6.513    0.002
   HSID                                     79.692   [illegible]              5.598    0.000

EXPLAINED                                   80.808    44          1.837       5.418    0.000

RESIDUAL                                   901.980[illegible]

TOTAL                                      982.783  2705[illegible]   0.[illegible]

   3959 CASES WERE PROCESSED.
   1253 CASES ( 31.6 PCT) WERE MISSING.
```

```
27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:47:02     U.C. IRVINE VAX/VMS                     DEC VAX-11/780 VMS V4.5

             * * *  A N A L Y S I S   O [illegible]

                   SES       FAMILY SOCIOECONOMIC STATUS INDEX
             BY    D1
                   HSID      HIGH SCHOOL ID

                                          SUM OF                     MEAN               SIGNIF
SOURCE OF VARIATION                      SQUARES      DF           SQUARE        F       OF F

MAIN EFFECTS                             329.826      44            7.496      7.176    0.000
  D1                                       0.373       2            0.186      0.179    0.837
  HSID                                   317.590      42      [illegible]      7.239    0.000

EXPLAINED                                329.826      44            7.496      7.176    0.000

RESIDUAL                                2779.796    2661            1.045

TOTAL                                   3109.622    2705            1.150

     3959 CASES WERE PROCESSED.
     1253 CASES ( 31.6 PCT) WERE MISSING.
```

```
10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:45:27    U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

          * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                  TED
          BY      D1
                  HSID       HIGH SCHOOL ID

                                       SUM OF                  MEAN                SIGNIF
SOURCE OF VARIATION                   SQUARES       DF        SQUARE          F     OF F

MAIN EFFECTS                         1704.609       44        38.741      6.358    0.000
   D1                                  62.350        2        31.175      5.116    0.006
   HSID                              1574.059       42    [illegible]     6.150    0.000

EXPLAINED                            1704.609       44        38.741      6.358    0.000

RESIDUAL                            22338.787     3666    [illegible]

TOTAL                               24043.396     3710         6.481

   3959 CASES WERE PROCESSED.
    248 CASES (  6.3 PCT) WERE MISSING.
```

```
27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:47:57     U.C. IRVINE VAX/VMS                     DEC VAX-11/780 VMS V4.5

                   * * *  A N A L Y S I S  O[illegible]

                        RDGSCR    AIMS READING TEST RAW SCORE
                BY      D2
                        HSID      HIGH SCHOOL ID

                                              SUM OF                MEAN                SIGNIF
  SOURCE OF VARIATION                         SQUARES     DF        SQUARE        F      OF F

  MAIN EFFECTS                               5192.409     44      118.009      8.225   0.000
     D2                                       184.404      2       92.202      6.426   0.002
     HSID                                    4933.090     42      117[illegible]   8.186   0.000

  EXPLAINED                                  5192.409     44      118.009      8.225   0.000

  RESIDUAL                                  52283.491   3644       14[illegible]

  TOTAL                                     57475.901   3688       15.585

       3959 CASES WERE PROCESSED.
        270 CASES (  6.8 PCT) WERE MISSING.
```

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   27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
   17:48:00    U.C. IRVINE VAX/VMS                 DEC VAX-11/780 VMS V4.5

                    * * *  A N A L Y S I S   O [illegible]

                        VOCSCR    TOTAL RAW VOCABULARY SCORE
                BY      D2
                        HSID      HIGH SCHOOL ID

                                             SUM OF                  MEAN                 SIGNIF
   SOURCE OF VARIATION                      SQUARES [illegible]

      MAIN EFFECTS                         5819.592     44         132.263      11.080   0.000
         D2                                 213.443      2         106.722       8.941   0.000
         HSID                              5630.073     42 [illegible]          11.230   0.000

      EXPLAINED                            5819.592     44         132.263      11.080   0.000

      RESIDUAL                            43498.083   36[illegible]

      TOTAL                               49317.675   3688          13.372

           3959 CASES WERE PROCESSED.
            270 CASES (  6.8 PCT) WERE MISSING.
```

```
10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:46:17    U.C. IRVINE VAX/VMS                DEC VAX-11/780 VMS V4.5

           * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                 STAGE     CHALL READING STAGE
         BY      D2
                 HSID      HIGH SCHOOL ID

                                               SUM OF                   MEAN                SIGNIF
SOURCE OF VARIATION                           SQUARES      DF         SQUARE         F       OF F

MAIN EFFECTS                                  411.013      44          9.341     9.886      0.000
   D2                                          11.754       2          5.877     6.220      0.002
   HSID                                       393.011      42          9.357     9.903      0.000

EXPLAINED                                     411.013      44          9.341     9.886      0.000

RESIDUAL                                     3464.060    3666          0.945

TOTAL                                        3875.074    3710          1.044

   3959 CASES WERE PROCESSED.
    248 CASES (  6.3 PCT) WERE MISSING.
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10-JUL-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:46:19    U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

            * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                PSTAGE    PERCENT IN LOW CHALL CATEGORY
          BY    D2
                HSID      HIGH SCHOOL ID

                                        SUM OF                  MEAN             SIGNIF
SOURCE OF VARIATION                    SQUARES      DF        SQUARE         F     OF F

MAIN EFFECTS                            41.509      44         0.943     8.306    0.000
   D2                                    3.088       2         1.544    13.596    0.000
   HSID                                 37.697      42         0.898     7.903    0.000

EXPLAINED                               41.509      44         0.943     8.306    0.000

RESIDUAL                               416.362    3666         0.114

TOTAL                                  457.871    3710         0.123

   3959 CASES WERE PROCESSED.
    248 CASES (  6.3 PCT) WERE MISSING.
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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:48:53    U.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

              * * *  A N A L Y S I S  O F [illegible]

                   ATT
           BY      D2
                   HSID     HIGH SCHOOL ID

                                       SUM OF                 MEAN                  SIGNIF
SOURCE OF VARIATION                   SQUARES                [illegible]            [illegible]

  MAIN EFFECTS                        103.659     44          2.356       1.580    0.009
    D2                                  0.349      2          0.175       0.117    0.889
    HSID                              102.232     42        [illegible]   1.632    0.006

  EXPLAINED                           103.659     44          2.356       1.580    0.009

  RESIDUAL                           4042.052   27[illegible] [illegible]

  TOTAL                              4145.711   2754          1.505

     3959 CASES WERE PROCESSED.
     1204 CASES ( 30.4 PCT) WERE MISSING.
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 27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
 17:48:56     U.C. IRVINE VAX/VMS                DEC VAX-11/780 VMS V4.5

                   * * *  A N A L Y S I S   O F  [illegible]

                     READING   TIME SPENT FREE READING
               BY    D2
                     HSID      HIGH SCHOOL ID

                                             SUM OF               MEAN                SIGNIF
   SOURCE OF VARIATION                      SQUARES     DF       SQUARE        F      OF F

     MAIN EFFECTS                            86.870     44        1.974      1.862    0.001
        D2                                    4.100      2        2.050      1.934    0.145
        HSID                                 83.842     42   [illegible]     1.883    0.001

     EXPLAINED                               86.870     44        1.974      1.862    0.001

     RESIDUAL                              2872.816   2710   [illegible]

     TOTAL                                 2959.686   2754        1.075

        3959 CASES WERE PROCESSED.
        1204 CASES ( 30.4 PCT) WERE MISSING.
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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:48:59     J.C. IRVINE VAX/VMS                   DEC VAX-11/780 VMS V4.5

                  * * *  A N A L Y S I S  O[illegible]

                NBOOKS    BOOKS READ ON OWN IN LAST YEAR
          BY    D2
                HSID      HIGH SCHOOL ID

                                         SUM OF                MEAN                 SIGNIF
SOURCE OF VARIATION                      SQUARES  [illegible]  [illegible]  [illegible]  [illegible]

   MAIN EFFECTS                           57.549      44       1.308        1.198   0.175
      D2                                   3.032       2       1.516        1.388   0.250
      HSID                                53.110  [illegible]  [illegible]  1.158   [illegible]

   EXPLAINED                              57.549      44       1.308        1.198   0.175

   RESIDUAL                             2958.984    2710       [illegible]

   TOTAL                                3016.532    2754       1.095

      3959 CASES WERE PROCESSED.
      1204 CASES ( 30.4 PCT) WERE MISSING.
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  27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
  17:49:53    U.C. IRVINE VAX/VMS                 DEC VAX-11/780 VMS V4.5

              * * * *  A N A L Y S [illegible]

                   SES        FAMILY SOCIOECONOMIC STAT[illegible]
             BY    D2
                   HSID       HIGH SCHOOL ID

                                          SUM OF                   MEAN                SIGNIF
  SOURCE OF VARIATION                     SQUARES

  MAIN EFFECTS                            331.041  [illegible]               7.205  0.000
     D2                                     1.588     2        0.794         0.760  0.468
     HSID                                 318.845  [illegible]

  EXPLAINED                               331.041    44  [illegible]         7.205  0.000

  RESIDUAL                               2778.58[illegible]

  TOTAL                                  3109.622  2705[illegible]

       3959 CASES WERE PROCESSED.
       1253 CASES ( 31.6 PCT) WERE MISSING.
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10-JUL-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
07:46:14     U.C. IRVINE VAX/VMS                DEC VAX-11/780 VMS V4.5

             * * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                   TED
          BY       D2
                   HSID      HIGH SCHOOL ID

                                          SUM OF                      MEAN                 SIGNIF
SOURCE OF VARIATION                      SQUARES        DF          SQUARE          F       OF F

MAIN EFFECTS                            1687.245        44          38.346      6.288      0.000
   D2                                     44.986         2          22.493      3.688      0.025
   HSID                                 1554.875        42          37.021      6.071      0.000

EXPLAINED                               1687.245        44          38.346      6.288      0.000

RESIDUAL                               22356.151      3666           6.098

TOTAL                                  24043.396      3710           6.481

    3959 CASES WERE PROCESSED.
     248 CASES (  6.3 PCT) WERE MISSING.
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23-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
 17:49:55   U.C. IRVINE VAX/VMS                   DEC VAX-11/780 VMS V4.5

          * * *  A N A L Y S I [illegible]

               REMED    REMEDIAL EDUCATION EXPERI[illegible]
          BY   D2
               HSID     HIGH SCHOOL ID

                                        SUM OF                  MEAN                SIGNIF
SOURCE OF VARIATION                    SQUARES [illegible]

   MAIN EFFECTS                          9.843   44 [illegible]           1.703  0.003
     D2                                  0.777    2          0.388       2.957  0.052
     HSID                                9.0[illegible]

   EXPLAINED                             9.843   44 [illegible]           1.703  0.003

   RESIDUAL                            349.[illegible]

   TOTAL                               359.431 2705          [illegible]

     3959 CASES WERE PROCESSED.
     1253 CASES ( 31.6 PCT) WERE MISSING.
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27-JUN-88   SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:49:01    J.C. IRVINE VAX/VMS                  DEC VAX-11/780 VMS V4.5

            * * *  A N A L Y S I S   O F   V A [illegible]

                  ACH
         BY       D2
                  HSID      HIGH SCHOOL ID

                                          SUM OF                MEAN              SIGNIF
SOURCE OF VARIATION                      SQUARES      DF       SQUARE       F      OF F

MAIN EFFECTS                             280.926      44        6.385     2.584   0.000
   D2                                     15.980       2        8.490     3.437   0.032
   HSID                                  255.712      42  [illegible]     2.465   0.000

EXPLAINED                                280.926      44        6.385     2.584   0.000

RESIDUAL                                6694.844  [illegible] [illegible]

TOTAL                                   6975.770    2756        2.533

     3959 CASES WERE PROCESSED.
     1204 CASES ( 30.4 PCT) WERE MISSING.
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27-JUN-88    SPSS-X RELEASE 2.2+ FOR VAX/VMS
17:50:00     U.C. IRVINE VAX/VMS                    DEC VAX-11/780 VMS V4.5

                  * * * A N A L Y S I S   O [illegible]

                  HSTRAK    HS CURRICULUM TRACK
             BY   D2
                  HSID      HIGH SCHOOL ID

                                         SUM OF                  MEAN              SIGNIF
SOURCE OF VARIATION                      SQUARES                                   OF

  MAIN EFFECTS                           80.252    44            1.824     5.378   0.000
     D2                                   3.859     2            1.929     5.688   0.003
     HSID                                77.874  [illegible]   [illegible] [illegible] 0.000

  EXPLAINED                              80.252    44            1.824     5.378   0.000

  RESIDUAL                              902.536  [illegible]   [illegible]

  TOTAL                                 982.788  2708          [illegible]

      3959 CASES WERE PROCESSED.
      1253 CASES ( 31.6 PCT) WERE MISSING.
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